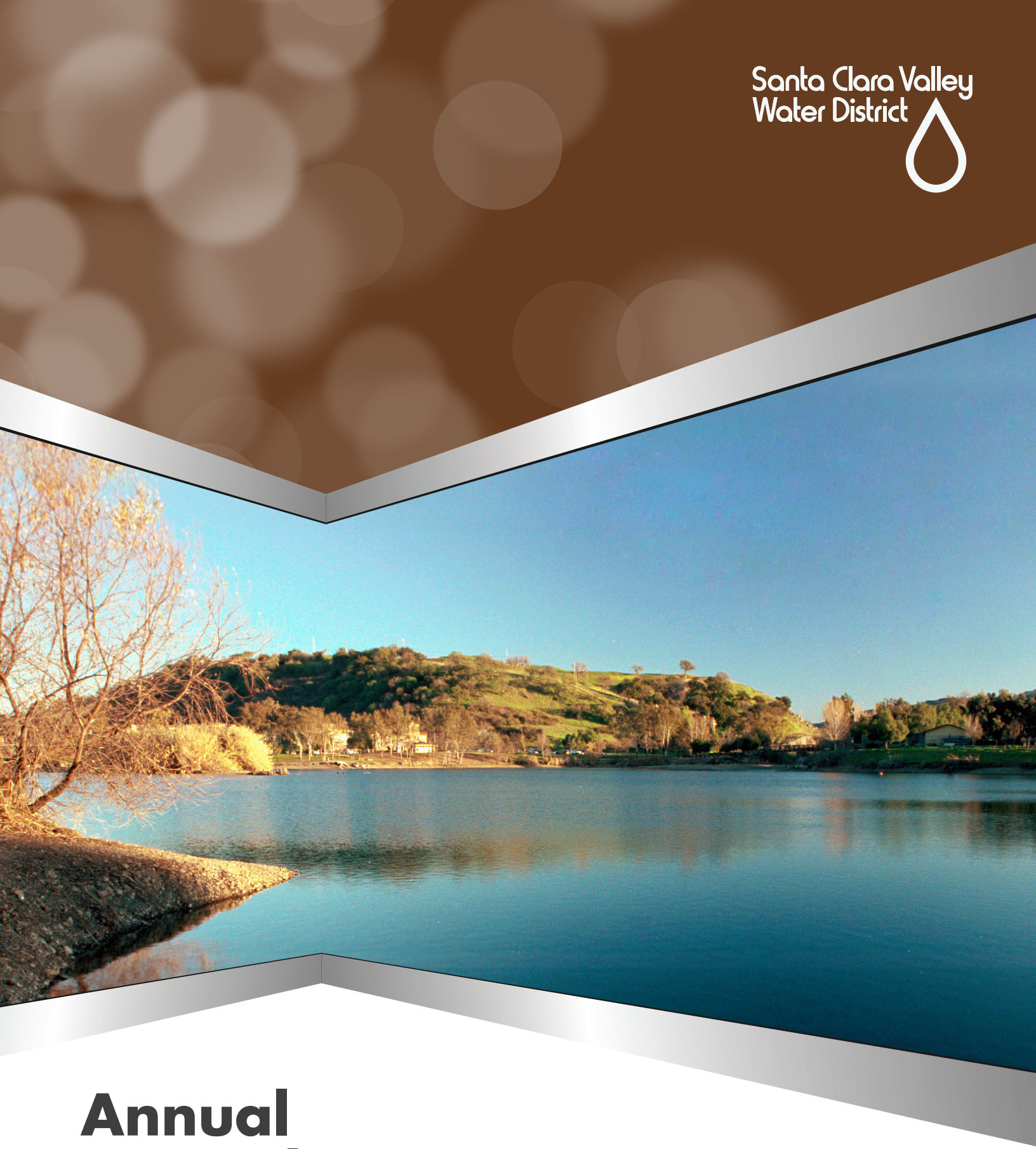
Santa Clara Valley Water District



Annual Groundwater Report

For Calendar Year 2013

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Executive Summary

This annual Groundwater Report describes groundwater use, levels, storage, land subsidence, and groundwater quality in the Santa Clara and Llagas Subbasins for calendar year 2013. Groundwater monitoring data are used to evaluate outcome measures identified in the District's Groundwater Management Plan (GWMP)[1]. These measures help evaluate performance in meeting **Board Water Supply Objective 2.1.1: "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion."**

Groundwater provided over 40 percent of the water used in the county in 2013. To help sustain and protect groundwater supplies, the District:

- Replenished groundwater with over 96,000 acre-feet (AF) of local and imported surface water,
- Reduced groundwater demands by over 205,000 AF through treated water deliveries, water conservation, and water recycling,
- Conducted extensive monitoring of water levels, groundwater quality, land subsidence, and recharge water quality,
- Implemented the well ordinance program and other programs to minimize threats to groundwater quality,
- Worked with basin stakeholders, land use agencies, and regulatory agencies to protect local groundwater resources.

Table ES-1 shows data for key indicators in 2013 as compared to 2012 and the last five years. Groundwater conditions were generally good despite ongoing extreme dry conditions. Water levels generally decreased as compared to 2012 due to higher pumping and minimal natural recharge, but were well above historical minimums at index wells. Estimated end of year groundwater storage was in the "normal" range of the District's Water Shortage Contingency Plan. Groundwater quality remained very good with the exception of nitrate in South County.

North County Groundwater Summary

Groundwater use was 95,200 AF, increasing 25% from 2012. Pumping location and use have remained relatively stable, with nearly all groundwater used for municipal and industrial (M&I) purposes. Groundwater levels decreased, but were above historical lows and thresholds established to minimize the risk of land subsidence. Estimated groundwater storage at the end of 2013 was 6,000 AF lower than in 2012.

North County groundwater is generally of very high quality. In 2013, 99% of all water supply wells tested met all health-based drinking water standards. The only exceptions were detections of aluminum at two wells and a solvent (1,1-Dichloroethene, or 1,1-DCE) at one well. Subsequent testing at the well with elevated 1,1-DCE indicated levels dropped below the drinking water standard. It is not uncommon to have a small number of wells with metals or ions above drinking water standards due to local geologic conditions. Public water systems must comply with drinking water standards, which may require treatment or blending prior to customer delivery.

South County Groundwater Summary

Groundwater pumping in the Coyote Valley and Llagas Subbasin was 11,600 AF and 46,700 AF, respectively. Pumping in the Llagas Subbasin increased by 6% compared to 2012. The location and use of groundwater has remained relatively stable, with approximately equal M&I and agricultural pumping. Groundwater levels were similar to or slightly lower than last year but remained well above historical lows at index wells. Estimated groundwater storage at the end of 2013 was 11,000 AF lower than in 2012.

Groundwater quality in South County is generally good with the exception of nitrate, which remains the primary groundwater protection challenge due to historic and ongoing sources. Nitrate was detected above the drinking water standard in about 30% of South County water supply wells tested (primarily domestic wells). For this reason, the outcome measure related to drinking water standards was not met. The District continues to offer basic well testing (including nitrate) to eligible domestic well owners. Efforts to develop Salt and Nutrient Management Plans in coordination with basin stakeholders are expected to be completed in 2014. As part of the Safe Clean Water Program, the District also began offering nitrate treatment system rebates for domestic well users exposed to elevated nitrate.

Table ES-1 2013 Groundwater Conditions as Compared to Other Indices

Index[1]	2013	Compared to 2012	Compared to Last 5 Years (2008 - 2012)
Managed Recharge	96,500 AF	Similar	Similar
Groundwater Pumping	153,500 AF	Up 16%	Up 9%
Percent of Total Water Used	41%	Up 3%	Same
Groundwater Levels[2]			
Santa Clara Plain	70.4 feet	Down 15%	Down 9%
Coyote Valley	263 feet	Same	Down 1%
Llagas	214.3 feet	Down 3%	Down 3%
End of Year Groundwater Storage	339,000 AF	Down 5%	--
Land Subsidence[3]	0.003 feet/year	Change from net uplift	--
Groundwater Quality[4]			
Santa Clara Plain - TDS	410	Similar[5]	Similar
Coyote Valley - TDS	330	Decrease	Decrease
Llagas - TDS	360	Similar	Similar
Santa Clara Plain – Nitrate	14	Similar	Similar
Coyote Valley – Nitrate	17.6	Increase	Increase
Llagas - Nitrate	22	Similar	Similar

1) Groundwater levels and quality are shown for three groundwater management areas: the Santa Clara Plain and Coyote Valley (which comprise the Santa Clara Subbasin) and the Llagas Subbasin.
2) Groundwater elevations represent the average of all readings at index wells for the time period noted.
3) The established tolerable rate of 0.01 feet per year was not exceeded, and water levels at all subsidence index wells were above these thresholds throughout 2013, indicating a low risk of permanent subsidence.
4) Values shown represent median groundwater quality in mg/L for all principal aquifer zone wells tested. Nitrate values shown are nitrate (as NO_3).
5) Individual wells sampled for TDS and nitrate vary each year so a numeric comparison of median values is not shown. "Similar" indicates that the regional median values were within 20 mg/L for TDS and 3 mg/L for nitrate.

Outcome measures related to groundwater storage, land subsidence, and water quality were met, with the exception of nitrate and chloride. Table ES-2 summarizes outcome measure performance and recommended actions to address measures not being met.

Table ES-2 Summary of 2013 Outcome Measure Performance and Action Plan

Groundwater Storage	• **OM 2.1.1.a.** Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain. Estimated end of 2013 Storage: 301,800 AF • **OM 2.1.1.b.** Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley. Estimated end of 2013 Storage: 10,300 AF • **OM 2.1.1.c.** Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin. Estimated end of 2013 Storage: 27,100 AF
Groundwater Levels and Subsidence	• **OM 2.1.1.d.** 100% of subsidence index wells with groundwater levels above subsidence thresholds. All ten subsidence index wells had groundwater levels above thresholds in 2013.
Groundwater Quality	• **OM 2.1.1.e.** At least 95% of countywide water supply wells meet primary drinking water standards. Only 79% of countywide water supply wells tested in 2013 met primary drinking water standards due to elevated nitrate in South County (mainly in domestic wells). If nitrate is not included, 99% of water supply wells met primary drinking water standards. • **OM 2.1.1.f.** At least 90% of South County wells meet Basin Plan agricultural objectives. Nearly all wells (99%) met Basin Plan agricultural objectives. **Action Plan for OM 2.1.1.e:** • Implement nitrate treatment system rebate program for domestic wells with elevated nitrate. • Complete Salt and Nutrient Management Plans in coordination with basin stakeholders to address nitrate loading.
Groundwater Quality Trends	• **OM 2.1.1.g.** At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids. This measure is nearly met for chloride, with 89% of wells showing stable or decreasing concentrations. This measure is met for nitrate as 93% of wells had stable or decreasing concentrations. This measure is met for total dissolved solids as 94% of wells had stable or decreasing concentrations. **Action Plan for OM 2.1.1.g:** • Complete Salt and Nutrient Management Plans in coordination with basin stakeholders to address salt loading.

Groundwater Outlook

Groundwater levels and storage will continue to decline as dry conditions persist and little surface water is available for managed recharge. Groundwater storage has been critical in helping to meet the county's water supply needs during the last three years with below-normal rainfall. Although GWMP targets for groundwater storage and land subsidence were met for 2013, the projected end of year storage for 2014 is below the 300,000 AF target and water levels are approaching subsidence thresholds in several index wells. In accordance with the Water Shortage Contingency Plan, the District Board has set a 20% water use reduction target in 2014 to ensure adequate groundwater reserves for 2015.

Due to ongoing dry conditions, the District has increased the monitoring frequency for water levels and subsidence. We will continue to actively monitor groundwater levels, land subsidence, and water quality to support operational decisions and ensure groundwater resources are protected. The District will also continue to track proposed legislation, policies, and regulatory standards that may impact groundwater resources or the District's ability to manage them.

1. INTRODUCTION

The Santa Clara Valley Water District (District) has the responsibility and authority to manage the Santa Clara and Llagas Subbasins in Santa Clara County per an act of the California legislature[2]. The District's objectives and authority related to groundwater management are to recharge groundwater basins, conserve, manage and store water for beneficial and useful purposes, increase water supply, protect surface water and groundwater from contamination, prevent waste or diminution of the District's water supply, and do any and every lawful act necessary to ensure sufficient water is available for present and future beneficial uses.

The District Board adopted Water Supply Objective 2.1.1, which reflects the mission to protect groundwater resources: *"Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion."* Pursuant to the District Act and Board policy, the District has identified the following basin management objectives in the Groundwater Management Plan (GWMP)[3]:

- Groundwater supplies are managed to optimize water supply reliability and minimize land subsidence.
- Groundwater is protected from existing and potential contamination, including salt water intrusion.

Purpose

This annual report describes groundwater conditions in Santa Clara County for calendar year 2013 including groundwater use, water levels, storage, quality, and land subsidence. The following outcome measures (OM) derived from the GWMP are also assessed to evaluate performance in meeting Water Supply Objective 2.1.1:

- OM 2.1.1.a. Greater than 278,000 AF[4] of projected end of year groundwater storage in the Santa Clara Plain.
- OM 2.1.1.b. Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley.
- OM 2.1.1.c. Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin.
- OM 2.1.1.d. 100% of subsidence index wells with groundwater levels above subsidence thresholds.
- OM 2.1.1.e. At least 95% of countywide water supply wells meet primary drinking water standards.
- OM 2.1.1.f. At least 90% of South County wells meet Basin Plan agricultural objectives.
- OM 2.1.1.g. At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids.

Study Area

This report presents information for the Santa Clara and Llagas Subbasins, which are managed by the District and are identified by the California Department of Water Resources as Subbasins 2-9.02 and 3-3.01, respectively (Figure 1). Due to different land use and management characteristics, the District divides the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and the Coyote Valley. Both the Santa Clara Plain and Llagas Subbasin have confined and recharge areas. Within confined areas, low permeability clays and silts separate shallow and principal aquifers, with the latter defined as aquifer materials greater than about 150 feet below ground surface.

[2] Santa Clara Valley Water District Act, Water Code Appendix, Chapter 60.
[3] Santa Clara Valley Water District, Groundwater Management Plan, July 2012.
[4] AF = acre-feet. One acre-foot is equal to 325,900 gallons.

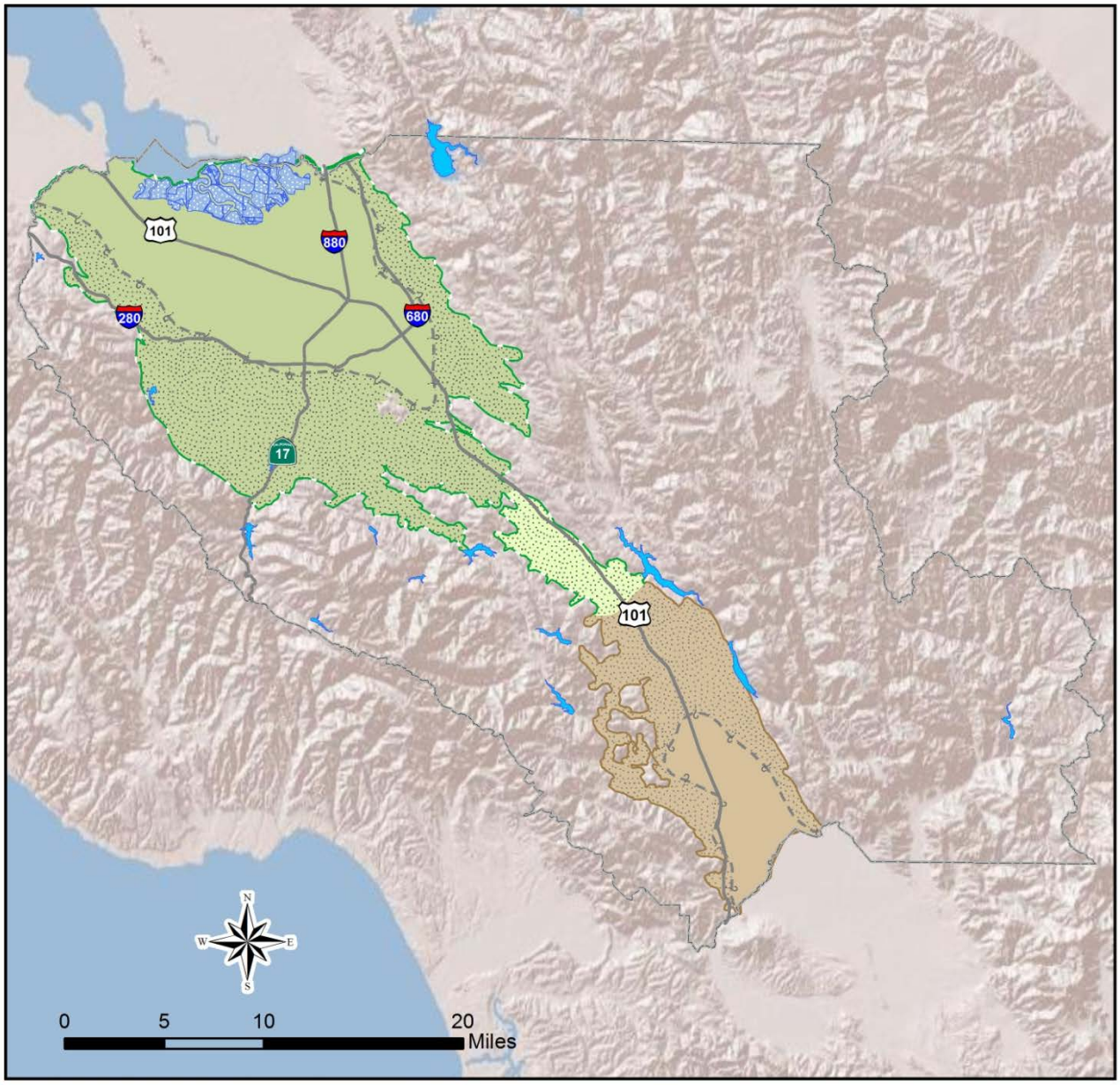
The information in this report is summarized by groundwater management area or by groundwater charge zone (Figure 2). Charge Zone W-2 (North County) generally coincides with the Santa Clara Plain, while Zone W-5 generally overlaps the combined area of the Coyote Valley and Llagas Subbasin.

Report Content

In addition to this Introduction, this Annual Groundwater Report for 2013 includes the following chapters:

- Chapter 2: Groundwater Pumping, Recharge, and Water Balance:
- Chapter 3: Groundwater Levels and Storage
- Chapter 4: Land Subsidence
- Chapter 5: Groundwater Quality
- Chapter 6: Other Groundwater Management Activities
- Chapter 7: Conclusions

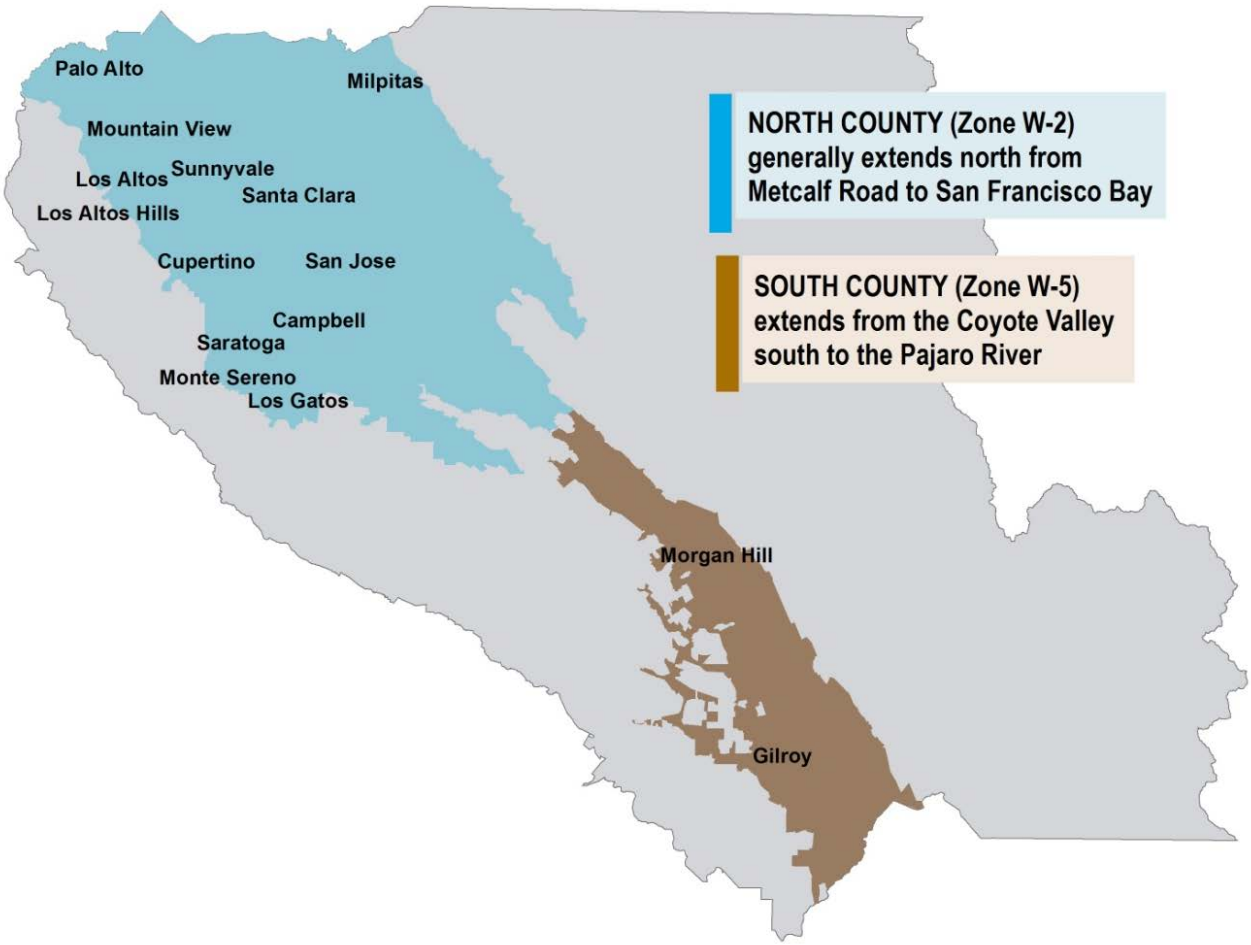
Figure 1 Santa Clara County Groundwater Subbasins



Santa Clara County
Reservoirs
Salt Ponds
Santa Clara Subbasin (DWR Basin 2-9.02)
Llagas Subbasin (DWR Basin 3-3.01)
Approximate Extent of Confined Area
Santa Clara Plain Confined Area
Santa Clara Plain Recharge Area
Coyote Valley Recharge Area
Llagas Confined Area
Llagas Recharge Area

Santa Clara Valley Water District

Figure 2 Groundwater Charge Zones



2. GROUNDWATER PUMPING, RECHARGE, AND WATER BALANCE

Over 153,000 AF of groundwater was pumped in 2013, providing about 40 percent of the water used by county residents and businesses. Groundwater pumping was higher than the previous year and the last five years with the exception of Coyote Valley, where no significant change was observed. The District replenished the groundwater subbasins with over 96,000 AF of local and imported water. In-lieu recharge, including treated water deliveries, recycled water use, and water conservation programs reduced demands on groundwater by over 205,000 AF.

The primary inflow to the subbasins was managed recharge, providing nearly 70% of total inflow. Groundwater pumping accounted for 94% of the subbasin outflows. Due to ongoing dry conditions, outflows exceeded inflows, resulting in a net decrease in storage of 19,000 AF.

2.1 Groundwater Pumping

Approximately 153,500 AF of groundwater was pumped in Santa Clara County compared to 131,200 AF in 2012. Figure 3 shows the location and volume of 2013 groundwater pumping, and Table 1 summarizes pumping by area and use category.

Table 1 2013 Groundwater Pumping by Use (AF)

Use Category	Zone W-2 North County	Zone W-5 South County		Total
	Santa Clara Plain	Coyote Valley	Llagas Subbasin	
Municipal & Industrial (M&I)	94,400	8,200	22,300	124,900
Domestic	200	100	1,400	1,700
Agricultural	600	3,300	23,000	26,900
Total	**95,200**	**11,600**	**46,700**	**153,500**

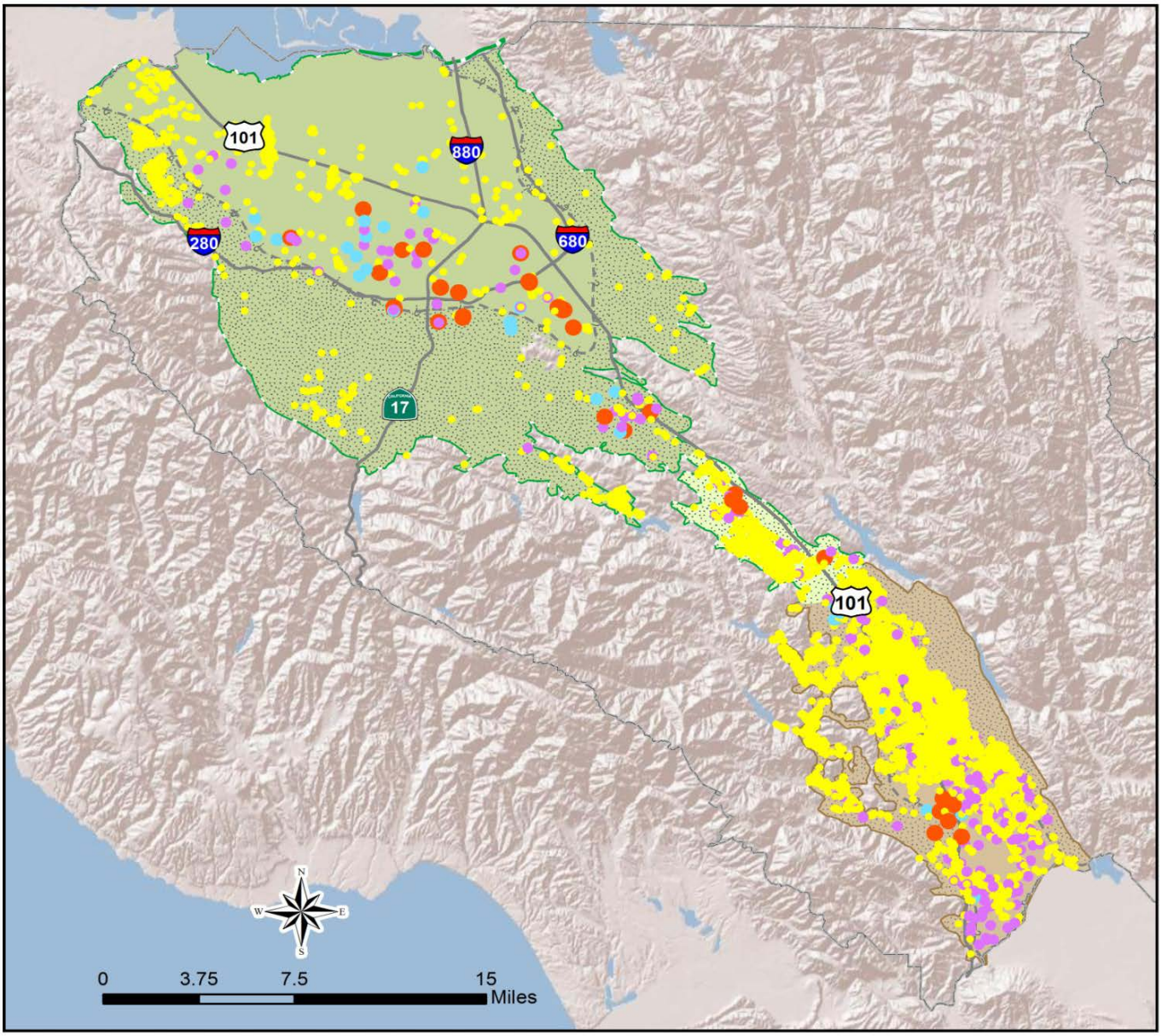
Groundwater in the North County is used primarily for M&I purposes, with minimal agricultural or domestic use. In South County, agricultural use is more significant. This is especially evident in the Llagas Subbasin where about half of the groundwater used is for agricultural purposes. While the quantity of groundwater used for domestic purposes is relatively small in South County, there are a large number of individual wells that reported groundwater use (Table 2).

Table 2 Wells Reporting Groundwater Use in 2013

Use Category	Zone W-2 North County	Zone W-5 South County	
	Santa Clara Plain	Coyote Valley	Llagas Subbasin
Municipal & Industrial (M&I)	734	61	252
Domestic	384	349	2,652
Agricultural	40	92	573

Note: Some wells may report pumping for more than one use category (e.g., domestic and agricultural).

Figure 3 2013 Groundwater Pumping (AF)



Groundwater Pumping (AF)

- 0.0 - 100.0
- 100.1 - 500.0
- 500.1 - 1000.0
- 1000.1 - 7000.0

- Santa Clara County
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent of Confined Area

- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

Groundwater Pumping Trends

Groundwater pumping is largely offset by the District's managed recharge of local and imported surface water as shown in Figure 4. Over the last 25 years, the annual managed recharge averages 70% of the amount of groundwater pumped.

Total 2013 groundwater pumping rose 16% from the previous year due to higher use in the Santa Clara Plain and Llagas Subbasin (Table 3). Pumping increased 25% in the Santa Clara Plain and 6% in the Llagas Subbasin, while Coyote Valley pumping was similar to last year. Groundwater use has increased over the last several years due to ongoing dry conditions. Groundwater provided about 40% of the water used countywide in 2013. That percentage is expected to increase if dry conditions persist and surface water supplies remain limited (Figure 5).

Groundwater pumping and use patterns over time are shown in Figure 6 for each groundwater management area. In the Santa Clara Plain, a significant drop in groundwater pumping is noted in the late 1980s following completion of the District's Santa Teresa Water Treatment Plant (WTP). Since then, pumping has averaged about 100,000 AF per year in the Santa Clara Plain. A notable increase in pumping in the Coyote Valley occurred in 2006 when a water retailer installed new wells and began extracting water to serve customers in other areas. This increased the average annual pumping volume by about 5,000 AF. Pumping in the Llagas Subbasin has remained relatively stable over the period of record.

Table 3 2013 Groundwater Pumping Compared to Other Indices (AF)

Groundwater Subbasin/Area	2013	2012	5 Year Average (2008-2012)	Period of Record (Average)
Santa Clara Subbasin, Santa Clara Plain	95,200	76,400	87,600	117,000
Santa Clara Subbasin, Coyote Valley	11,600	11,700	12,800	8,500
Llagas Subbasin	46,700	44,100	42,900	42,500
Total	**153,500**	**132,200**	**143,300**	**168,000**

Note: The period of record is 1981-2012 for the Santa Clara Plain and 1988-2012 for the Coyote Valley and Llagas Subbasin.

Major Groundwater Users

The ten largest groundwater users in each charge zone are shown on Figure 7. Water retailers are the primary users in North County, accounting for over 90% of all pumping. San Jose Water Company is the largest individual user, followed by other retailers, a few large industrial users, and golf courses.

Unlike North County, the majority of pumping in South County (55%) is from numerous individual pumpers including agricultural and domestic users. In South County, the largest individual groundwater users are the cities of Gilroy and Morgan Hill, and water retailers account for over 40% of groundwater pumped. Other large individual users include golf courses and industrial users.

Figure 4 Countywide Groundwater Pumping and Managed Recharge (AF)

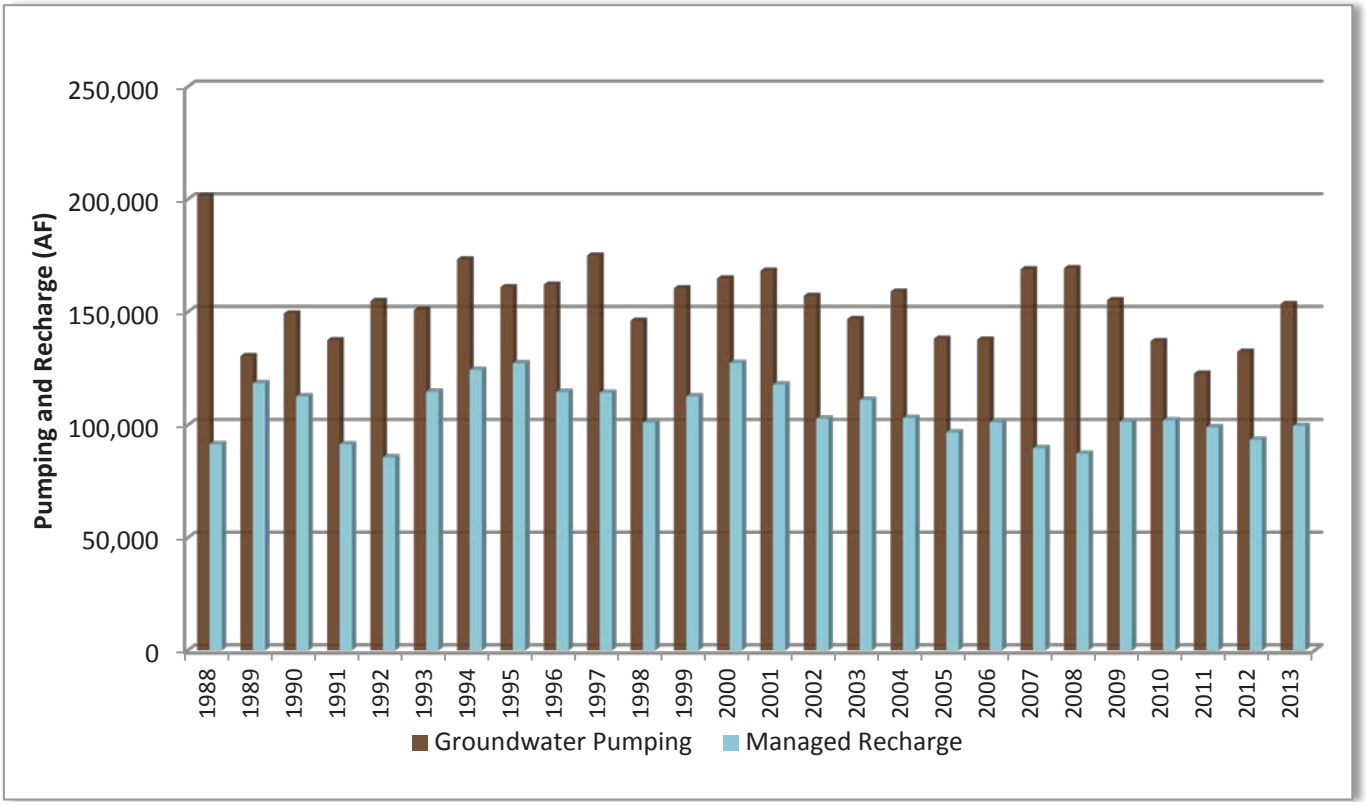


Figure 5 Countywide Water Use

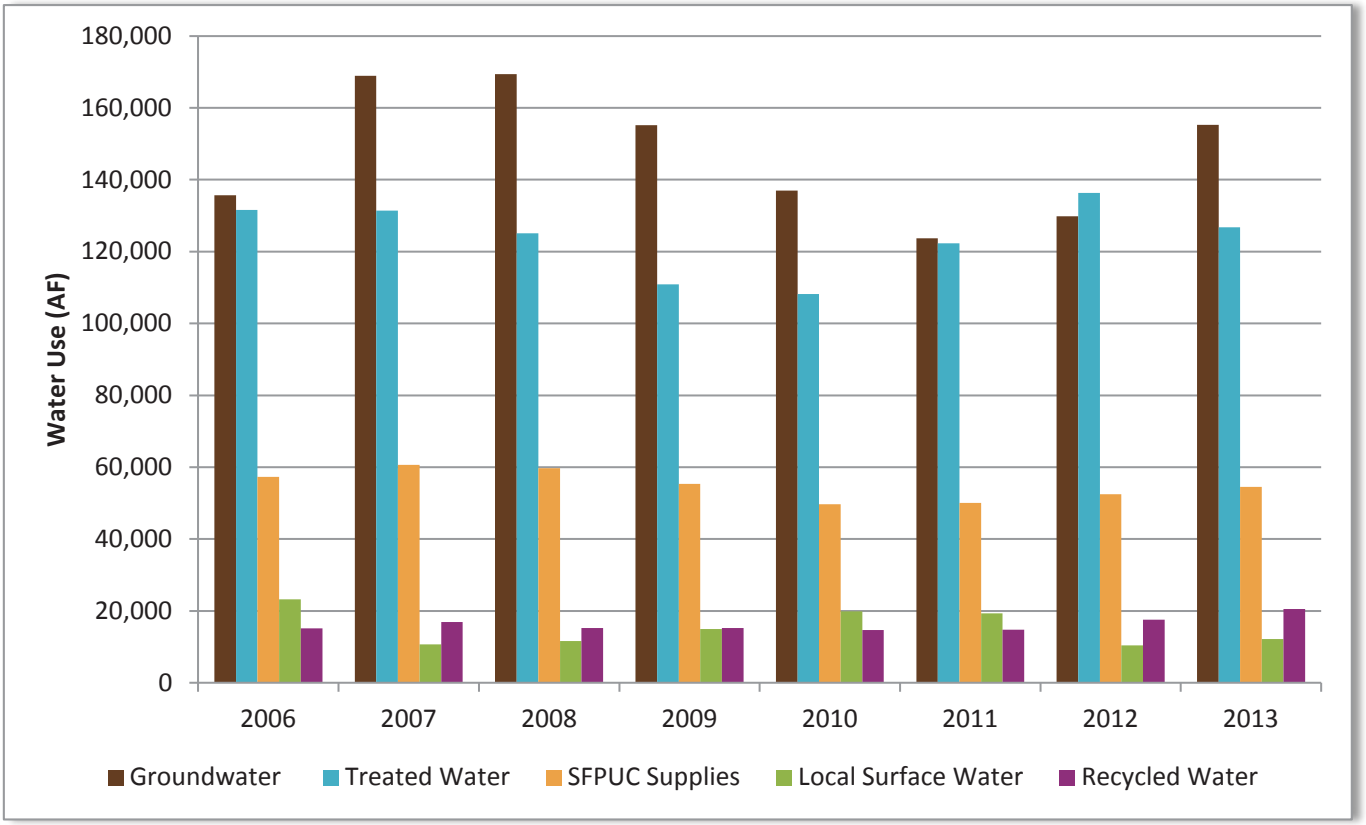
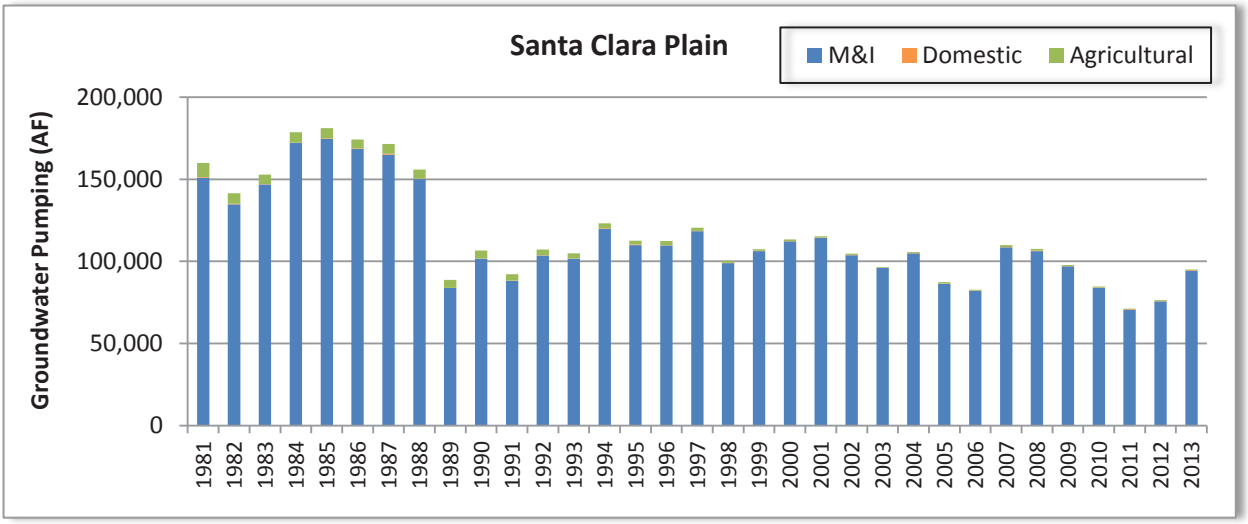
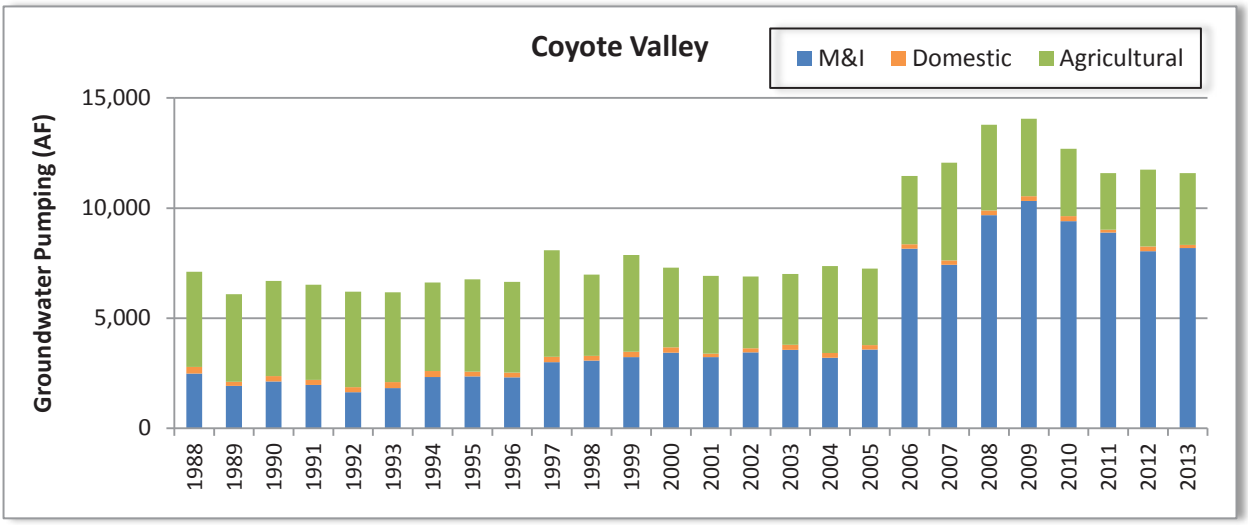


Figure 6 Groundwater Pumping by Use (AF)





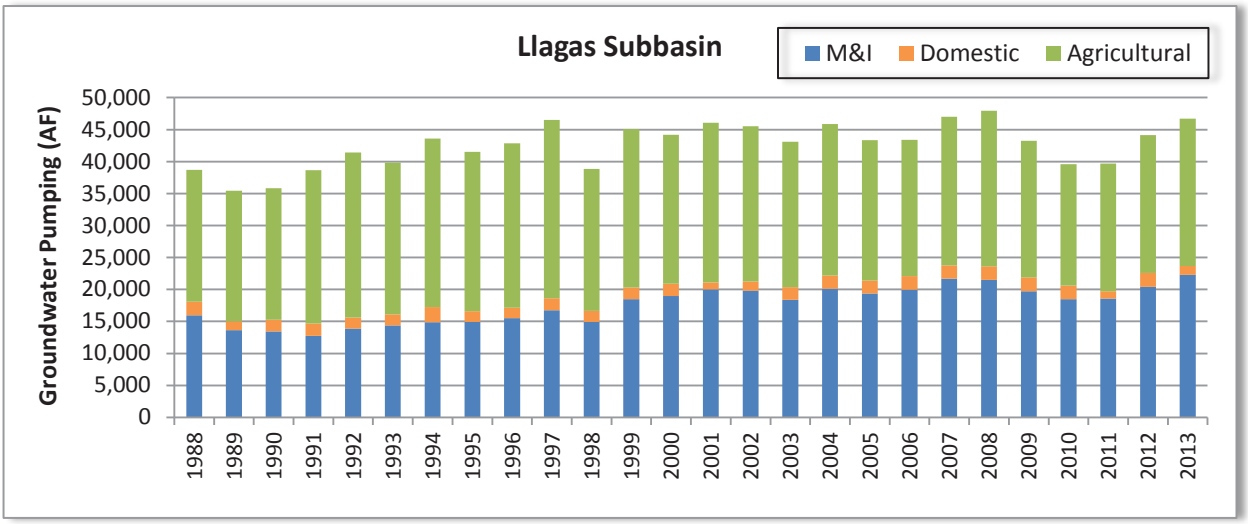
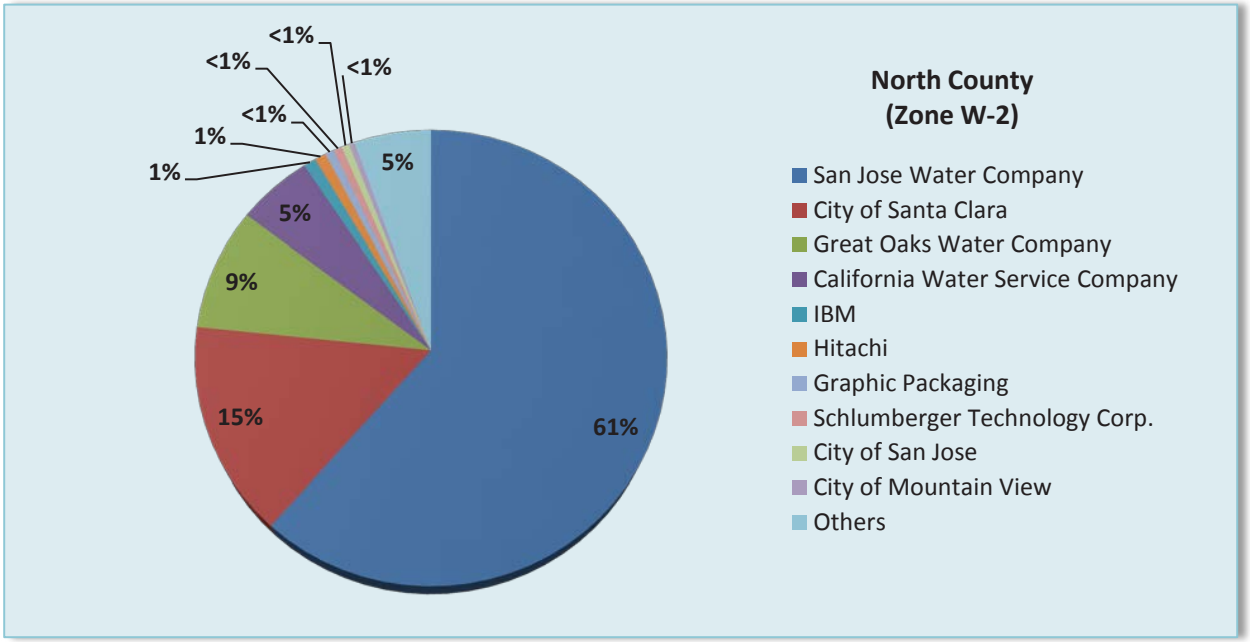
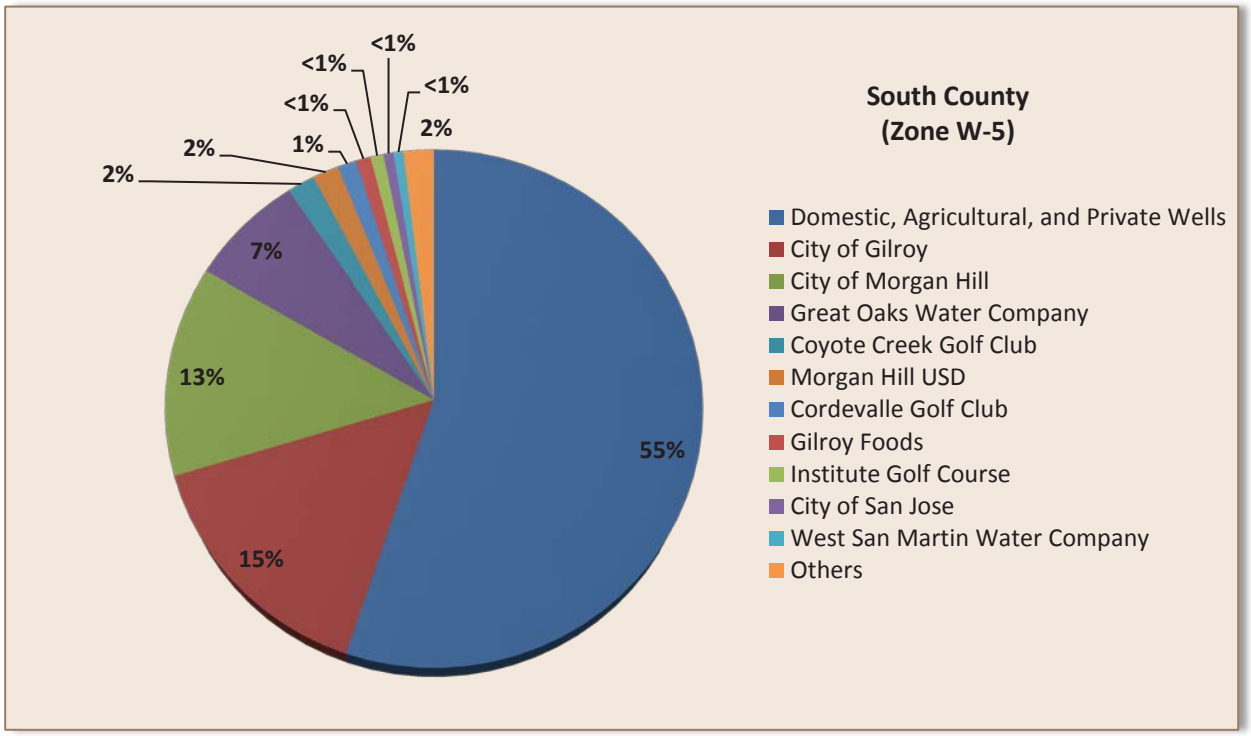


Figure 7 Percent of Total Pumping by Major Groundwater Users in 2013





2.2 Groundwater Recharge

Since the 1930s, the District's water supply strategy has been to maximize the conjunctive management of surface water and groundwater. The amount of groundwater pumped far exceeds what is replenished naturally by rainfall, so the District's managed recharge and in-lieu recharge activities are critical to ensuring water supply reliability.

Managed Recharge

The District replenishes the groundwater subbasins with imported water and runoff captured in 10 local reservoirs. District recharge facilities include more than 300 acres of recharge ponds and over 90 miles of creeks (Figure 8). Imported sources include the Federal Central Valley Project (CVP) and the State Water Project (SWP).

About 96,500 AF of local and imported water was recharged through District recharge facilities in 2013 (Table 4). The majority of District managed recharge (73%) was in-stream recharge. Imported water accounted for 70% of managed recharge in North County; in South County usage of local and imported water was approximately equal (Figure 9). The use of imported or local water for managed recharge depends on a number of factors including hydrology, imported water allocations, treatment plant demands, and environmental needs. In general, a greater percentage of local water is used for recharge in wet years due to increased capture of local storm runoff in local reservoirs.

Table 4 2013 Managed Recharge (AF)

Zone	In-Stream Recharge (Creeks)	Off-Stream Recharge (Recharge Ponds)	Total
W-2 (North County)	40,600	23,300	63,900
W-5 (South County)	29,700	2,900	32,600
Total	70,300	26,200	96,500

Operating restrictions have been imposed on several District reservoirs while seismic stability is analyzed, limiting the amount of local water that can be stored for groundwater recharge. Major upcoming capital projects include seismic retrofit of Anderson, Calero, and Guadalupe Dams.

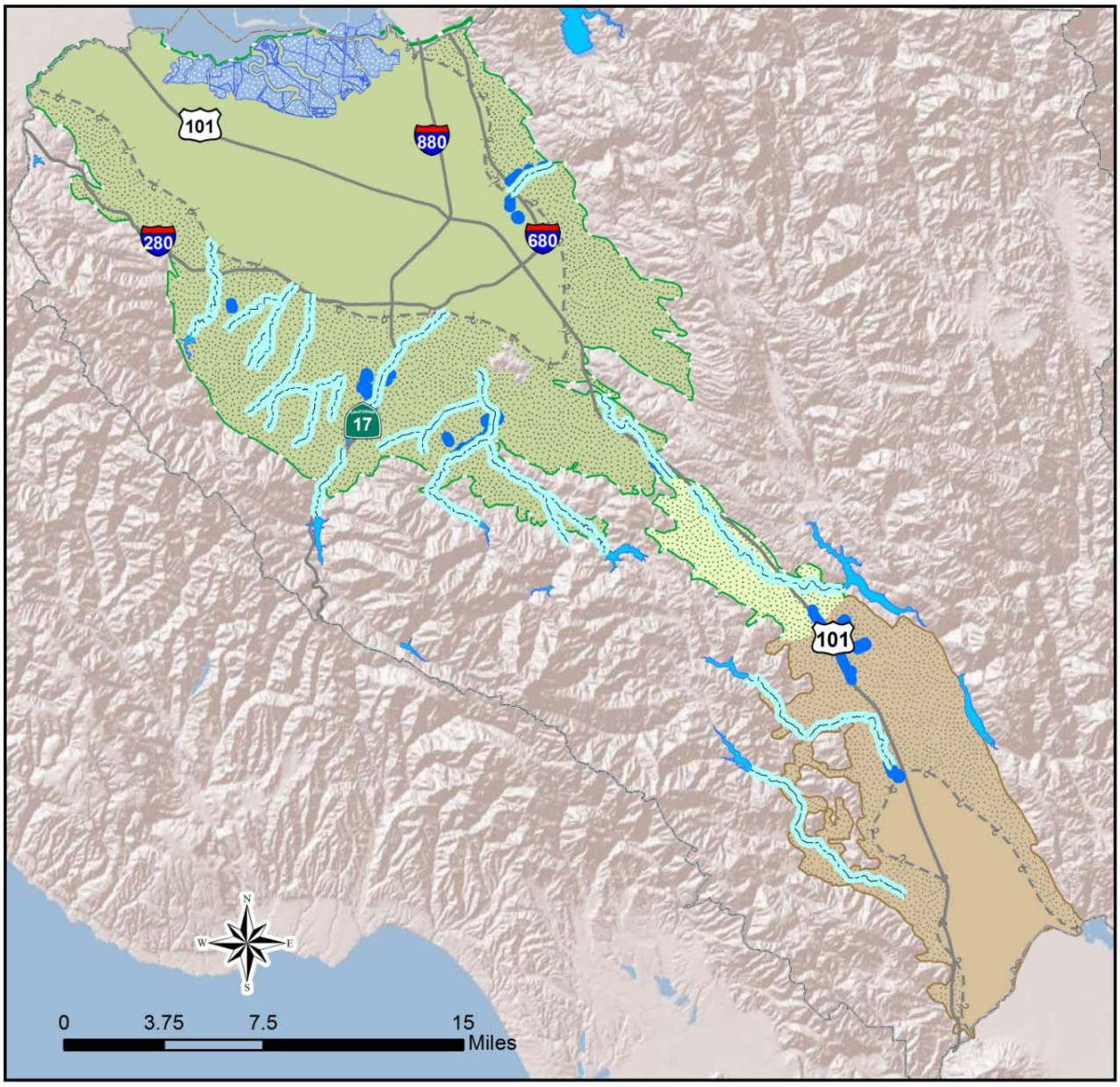
In-Lieu Recharge

The District's treated surface water deliveries, water conservation, and recycling programs play a critical role in maintaining groundwater storage by reducing demand on groundwater. In 2013, treated water and recycled water provided about 126,800 and 20,600 AF of water, respectively. The District's water conservation programs also saved approximately 57,900 AF[5].

Construction of the District's Silicon Valley Advanced Water Purification Center was recently completed. This state-of-the-art facility in San Jose produces up to eight million gallons per day of highly purified water by treating municipal wastewater with microfiltration, reverse osmosis and ultraviolet light. This facility supports the District's goal of expanding use of recycled water, which reduces demand on groundwater.

[5] Santa Clara Valley Water District, FY 2014-15 Protection and Augmentation of Water Supplies, February 2014.

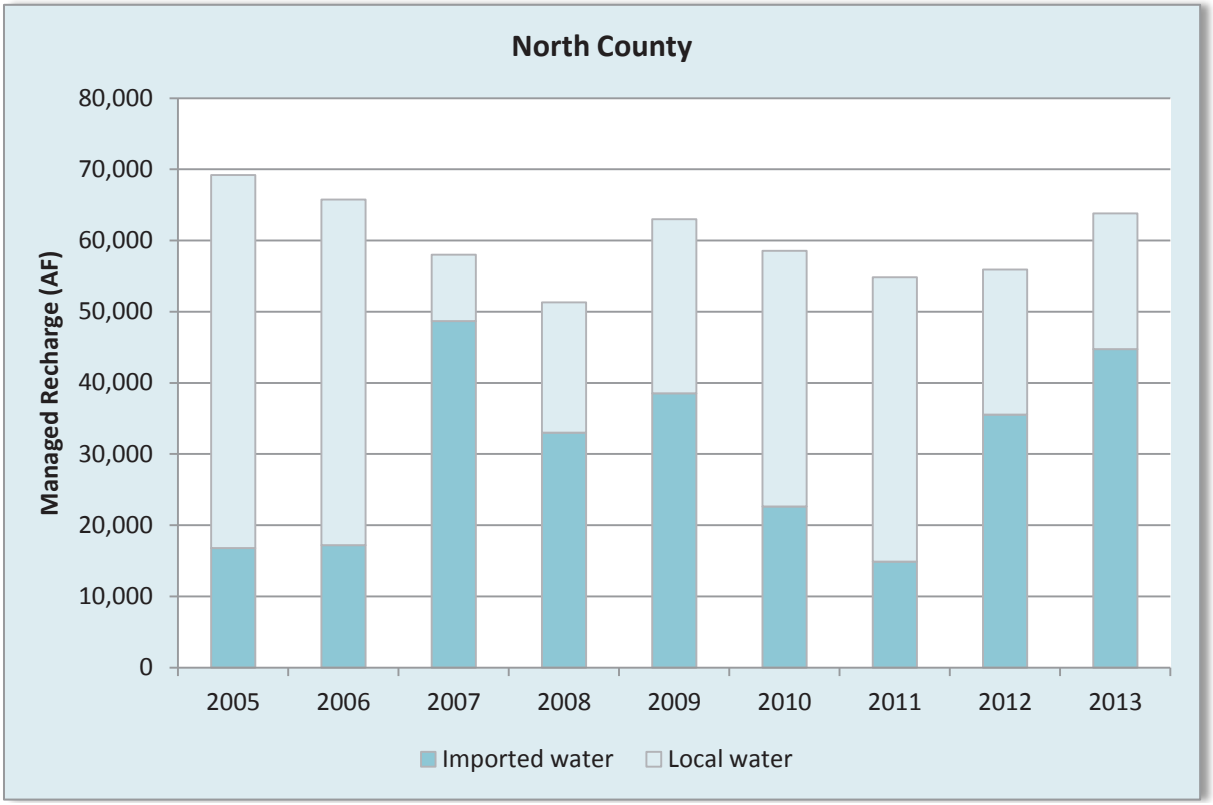
Figure 8 District Managed Recharge Facilities

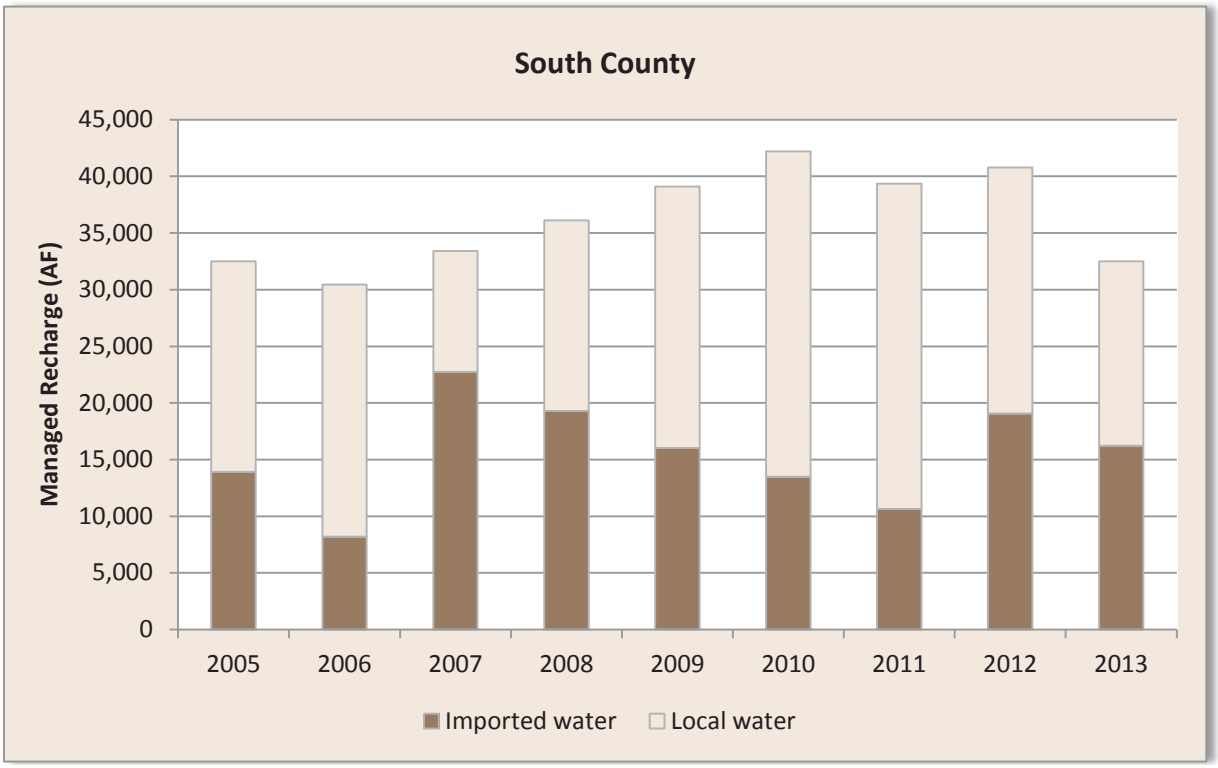


Santa Clara County
Instream Recharge
District Recharge Ponds or Facilities
Reservoirs
Salt Ponds
Santa Clara Subbasin (DWR Basin 2-9.02)
Llagas Subbasin (DWR Basin 3-3.01)
Approximate Extent of Confined Area
Santa Clara Plain Confined Area
Santa Clara Plain Recharge Area
Coyote Valley Recharge Area
Llagas Confined Area
Llagas Recharge Area

Santa Clara Valley Water District

Figure 9 Managed Recharge by Source (AF)





2.3 Groundwater Balance

The water balance provides an assessment of annual inflows and outflows for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, as shown in Figure 10. It should be noted that many terms presented in the water balance cannot be directly measured and represent estimated values from the District's groundwater flow models.

Inflows

Major inflows to the subbasins are primarily controlled by hydrologic conditions and include:

- Managed recharge by the District using local and imported surface water,
- Natural recharge, which includes deep percolation of rainfall, natural seepage through creeks, and return flows from septic systems and irrigation, and
- Subsurface inflow from adjacent aquifer systems.

Total inflows to the subbasins were 146,000 AF in 2013, with managed recharge providing nearly 70% of the total. Managed recharge far exceeded natural recharge, which provided about 27% of total inflows. It should be noted that the model-derived recharge estimate is slightly higher than the value presented earlier in this report, which is based on surface water accounting estimates. Subsurface inflow accounted for about 5% of the total inflow.

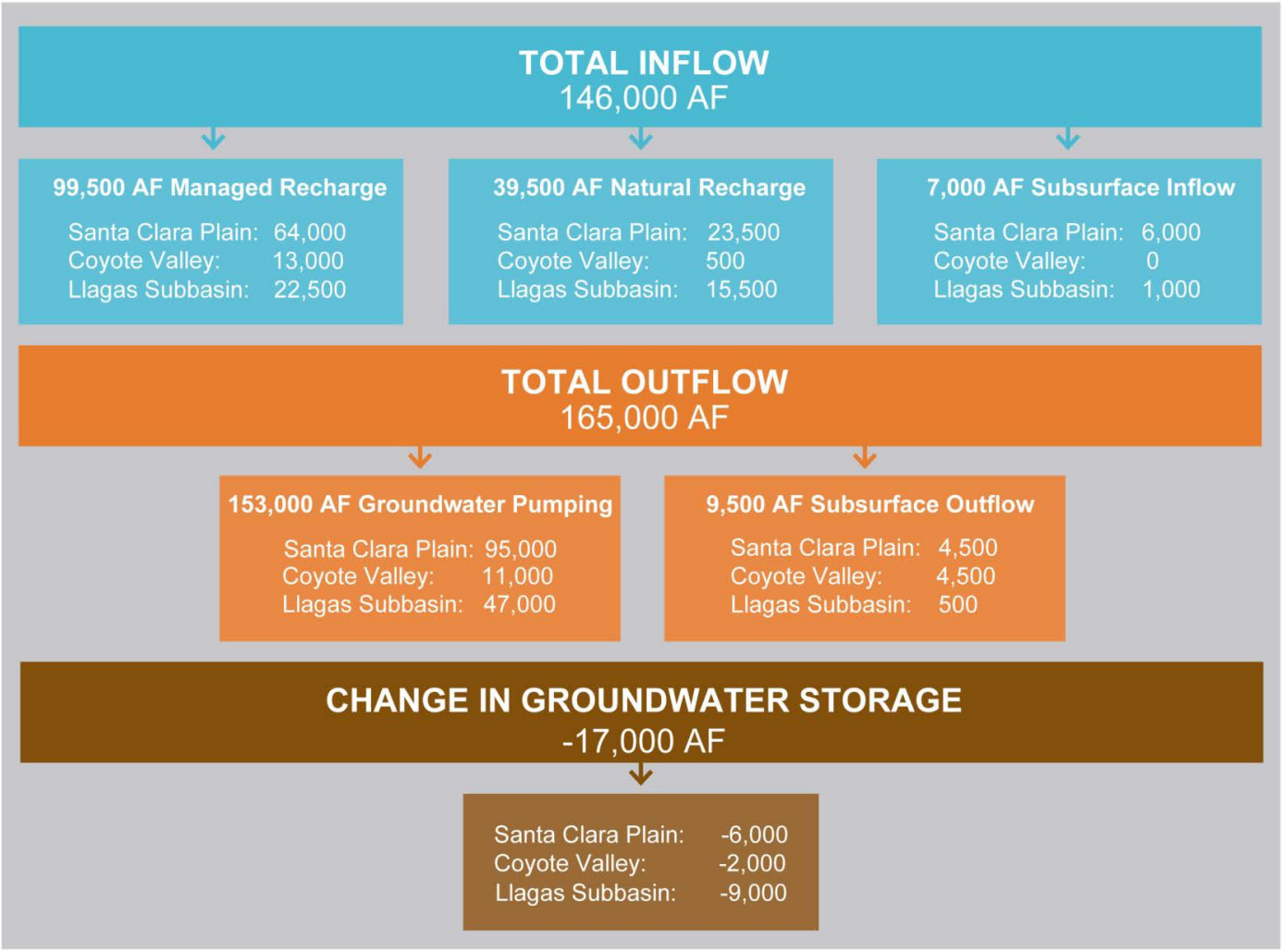
Outflows

The primary outflow of groundwater is due to pumping, which accounts for 93% of the total outflow of 165,000 AF in 2013. Subsurface outflow to adjacent aquifer systems was about 9,500 AF, or 6% of the total outflow. This included approximately 4,500 AF of subsurface flow from the Santa Clara Plain to San Francisco Bay, 4,500 AF of flow from the Coyote Valley to the Santa Clara Plain, and 500 AF of flow from the Llagas Subbasin to the Hollister Subbasin.

Change in Storage

Based on the estimated inflows and outflows, there was an estimated decrease in storage of 17,000 AF in 2013 due to ongoing dry conditions and increased reliance on groundwater reserves. Storage in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin decreased by about 6,000 AF, 2,000 AF, and 9,000 AF respectively.

Figure 10 2013 Groundwater Balance



Notes:

1) Groundwater balance terms presented are estimates based on calibrated groundwater flow models and values are rounded to the nearest 500 AF.
2) Managed recharge represents direct replenishment by the District using local and imported water. Estimates from the groundwater models may differ slightly from surface water accounting estimates.
3) Natural recharge includes all uncontrolled recharge, including the deep percolation of rainfall, septic system and/or irrigation return flows, and natural seepage through creeks.
4) Subsurface inflow represents inflow from adjacent aquifer systems. In the Santa Clara Plain, this includes inflow from the Coyote Valley. In the Llagas Subbasin, it represents inflow from the Bolsa Subbasin in San Benito County.
5) Groundwater pumping is based on pumping reported by water supply well owners.
6) Subsurface outflow represents outflow to adjacent aquifer systems. In the Santa Clara Plain, this includes outflows to San Francisco Bay. In Coyote Valley, this includes outflow to the Santa Clara Plain, and in the Llagas Subbasin, this includes outflows to the Bolsa Subbasin in San Benito County.

3. GROUNDWATER LEVELS AND STORAGE

The District collected water level measurements from over 200 wells in 2013, and also evaluated water levels from over 80 wells measured by water retailers. Groundwater levels were generally lower than 2012 due to ongoing dry conditions and increased groundwater pumping. However, groundwater levels remained above historical minimums at index wells. Estimated end of year groundwater storage decreased by 17,000 AF from last year. Although GWMP targets for storage were met for 2013, the projected end of year storage for 2014 is below the 300,000 AF target. In accordance with the Water Shortage Contingency Plan, the District Board has set a 20% water use reduction target in 2014 to ensure fair groundwater reserves for 2015.

3.1 Groundwater Levels

Comprehensive and accurate monitoring data allows the District to evaluate groundwater level and storage conditions to support operational decisions, and water supply planning efforts. The District measured depth to water data from over 200 wells on a daily, monthly, or quarterly basis as shown in Figure 11[6]. The District also evaluated water levels from over 80 water supply wells measured by water retailers.

In 2009, the Governor signed SBX7 6, which established the California Statewide Groundwater Elevation Monitoring (CASGEM) program under the DWR. As the designated monitoring entity for Santa Clara County, the District uploads quarterly monitoring data to the CASGEM website for over 100 monitoring wells, including over 1,000 groundwater elevation measurements uploaded in 2013.

Three index wells are used to represent general conditions within the Santa Clara Plain, Coyote Valley, and the Llagas Subbasin (Figure 11). Table 5 shows groundwater levels for the index wells in March and October, which typically represent the seasonal high and low water levels, respectively. Due to continued dry conditions, average groundwater levels were lower than the previous year and the five-year average, although they remained well above the historical minimums observed (Figure 12). Groundwater levels were also higher than thresholds established to minimize the risk of land subsidence as described further in Section 4.

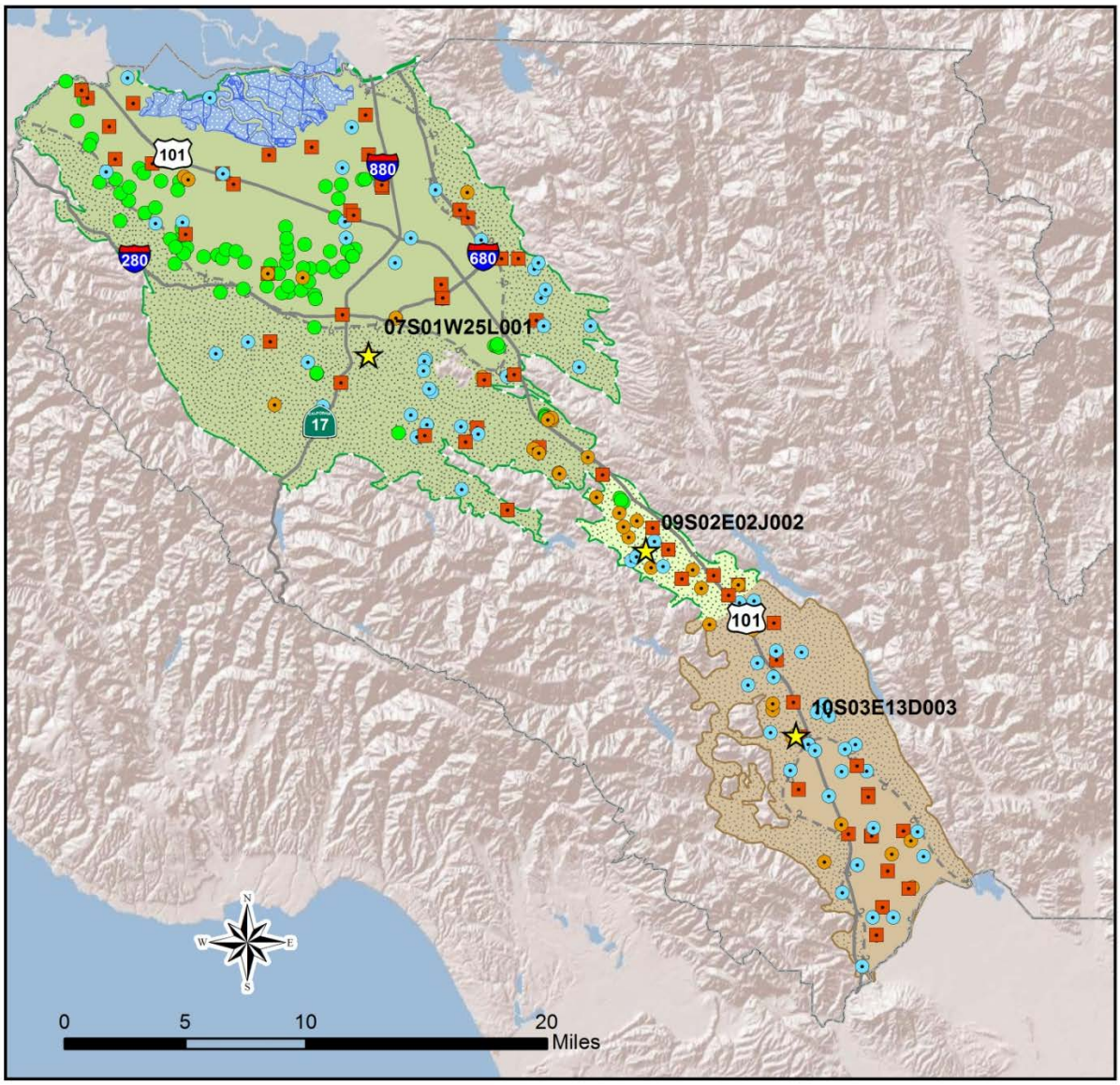
Table 5 Groundwater Levels at Index Wells (feet above mean sea level)

Groundwater Subbasin/Area	Index Well	March 2013	October 2013	2013 Average	2012 Average	5 Year Average (2008-2012)	Period of Record Average
Santa Clara Subbasin, Santa Clara Plain	07S01W25L001	81.50	62.38	70.4	83.3	77.10	4.90
Santa Clara Subbasin, Coyote Valley	09S02E02J002	265.90	261.12	263.0	263.3	266.70	264.61
Llagas Subbasin	10S03E13D003	229.10	201.20	214.3	221.2	220.70	220.04

Note: The period of record for the index wells begins in 1936 for the Santa Clara Plain, 1948 for the Coyote Valley, and 1969 for the Llagas Subbasin.

[6] Note, in 2014 the District has increased the monitoring frequency for all wells that we measure to monthly in light of ongoing, extreme dry conditions.

Figure 11 2013 Groundwater Level Monitoring



Monitoring Frequency

- Water Level Index Wells (Monthly)
- Quarterly
- Monthly
- Daily
- Wells Measured by Water Retailers

- Salt Ponds
- Santa Clara County
- Approximate Extent of Confined Area
- Santa Clara Plain Confined Area

- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)

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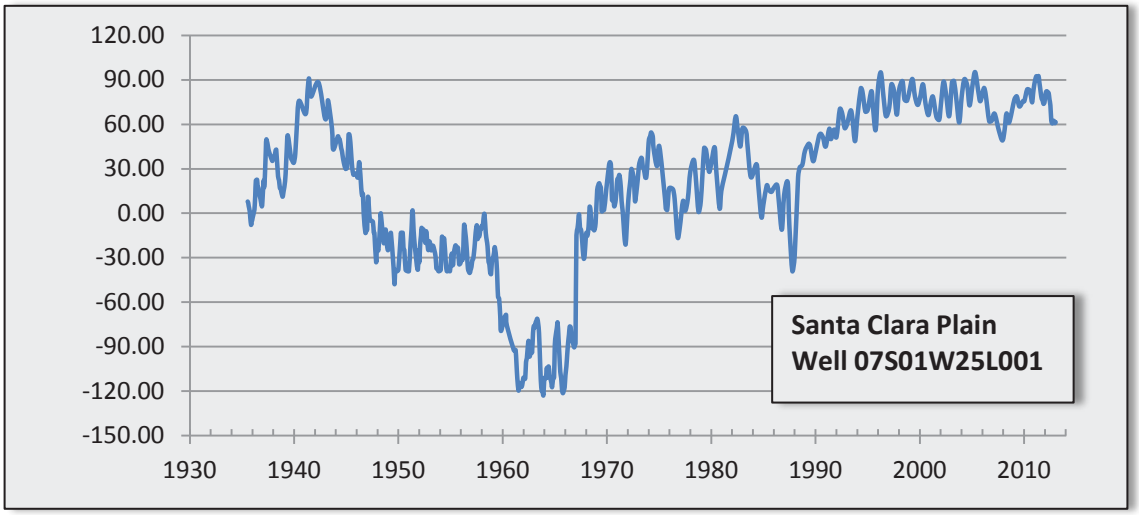
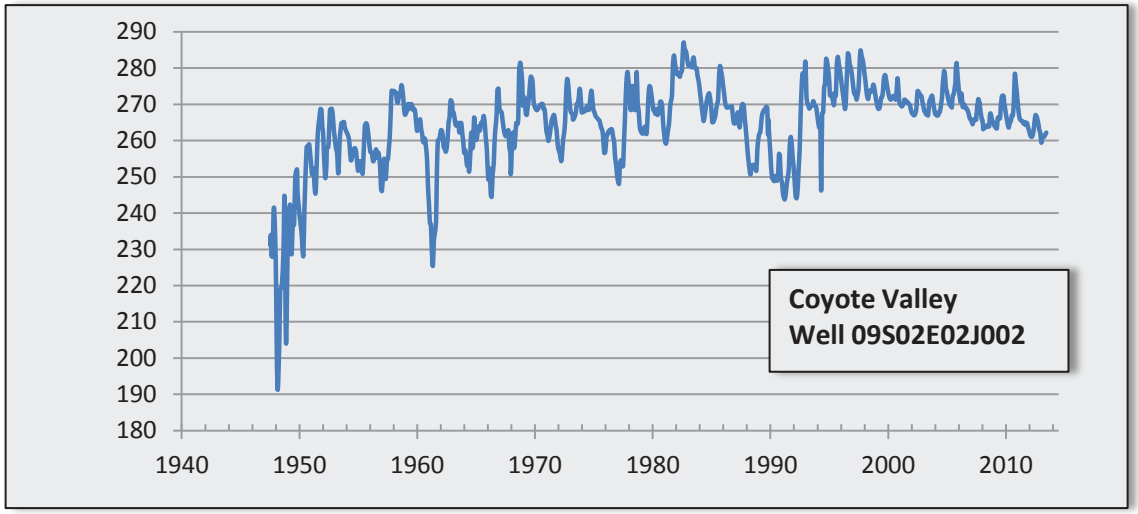
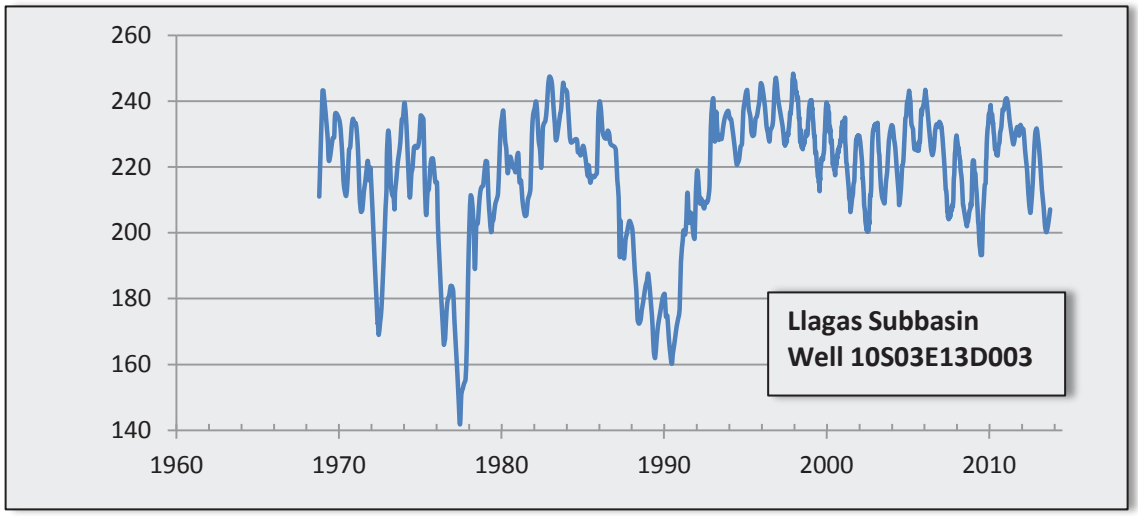
Figure 12 Groundwater Levels at Index Wells (feet above mean sea level)





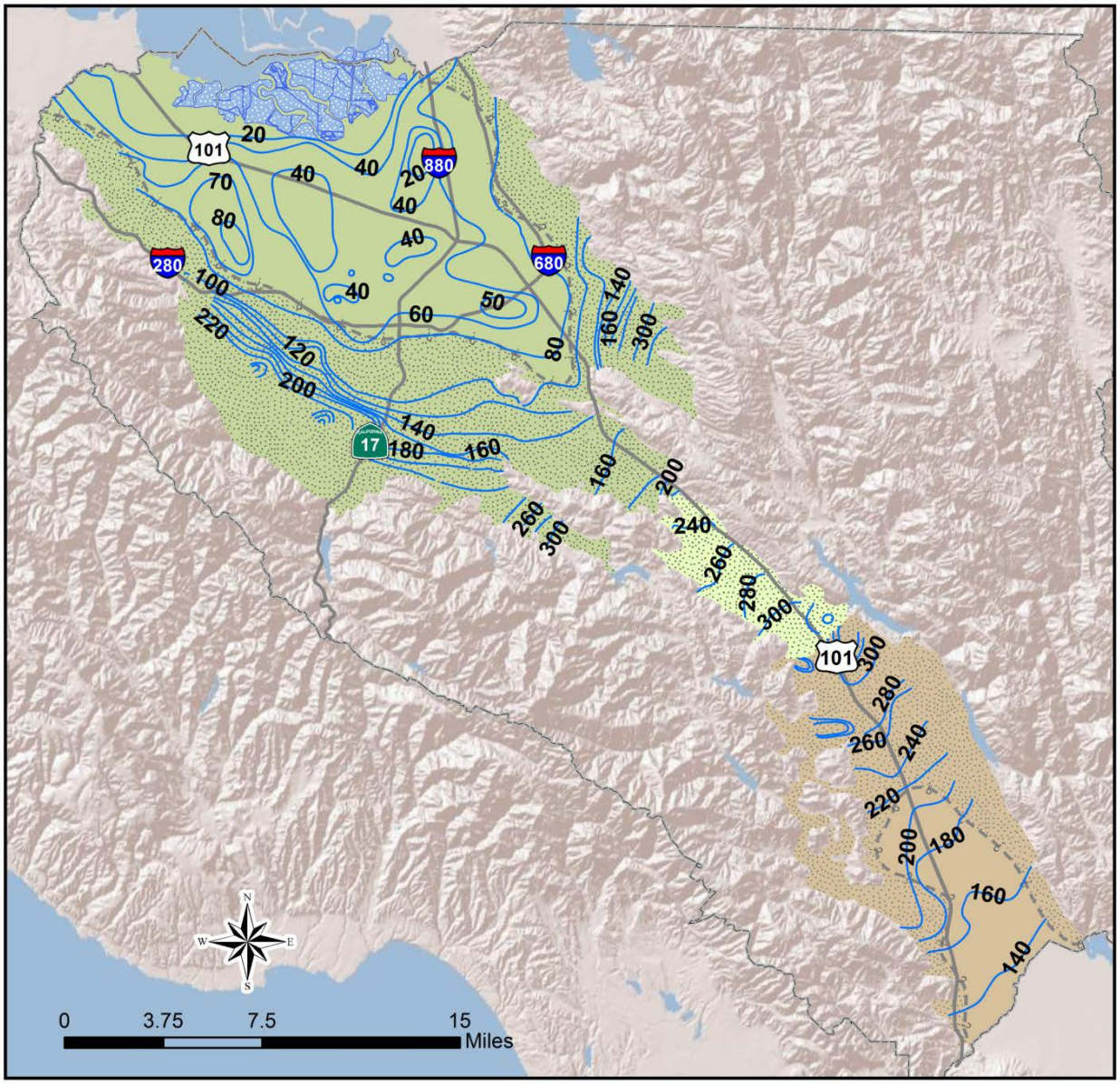


Groundwater elevation contours for the principal aquifer zone in March and October of 2013 are shown in Figures 13 and 14, respectively. These figures show the typical seasonal pattern of higher groundwater levels in the spring and lower levels in the fall due increased pumping and less natural recharge in the summer and fall.

In the Santa Clara Subbasin, groundwater levels are highest in the Coyote Valley and the recharge areas of the Santa Clara Plain. Groundwater levels generally decrease within the interior, confined area of the subbasin, and the general groundwater flow direction is northwest toward San Francisco Bay. The District's managed recharge helps maintain adequate pressure in the principal aquifer zone such that groundwater flows toward the bay and keeps salt water from intruding inland.

The highest groundwater levels in the Llagas Subbasin are in the recharge area in the north, and groundwater generally flows southeast toward the Pajaro River and San Benito County. Managed and natural recharge within the recharge area maintains groundwater pressures within the confined area, where groundwater exists in partially to fully confined conditions.

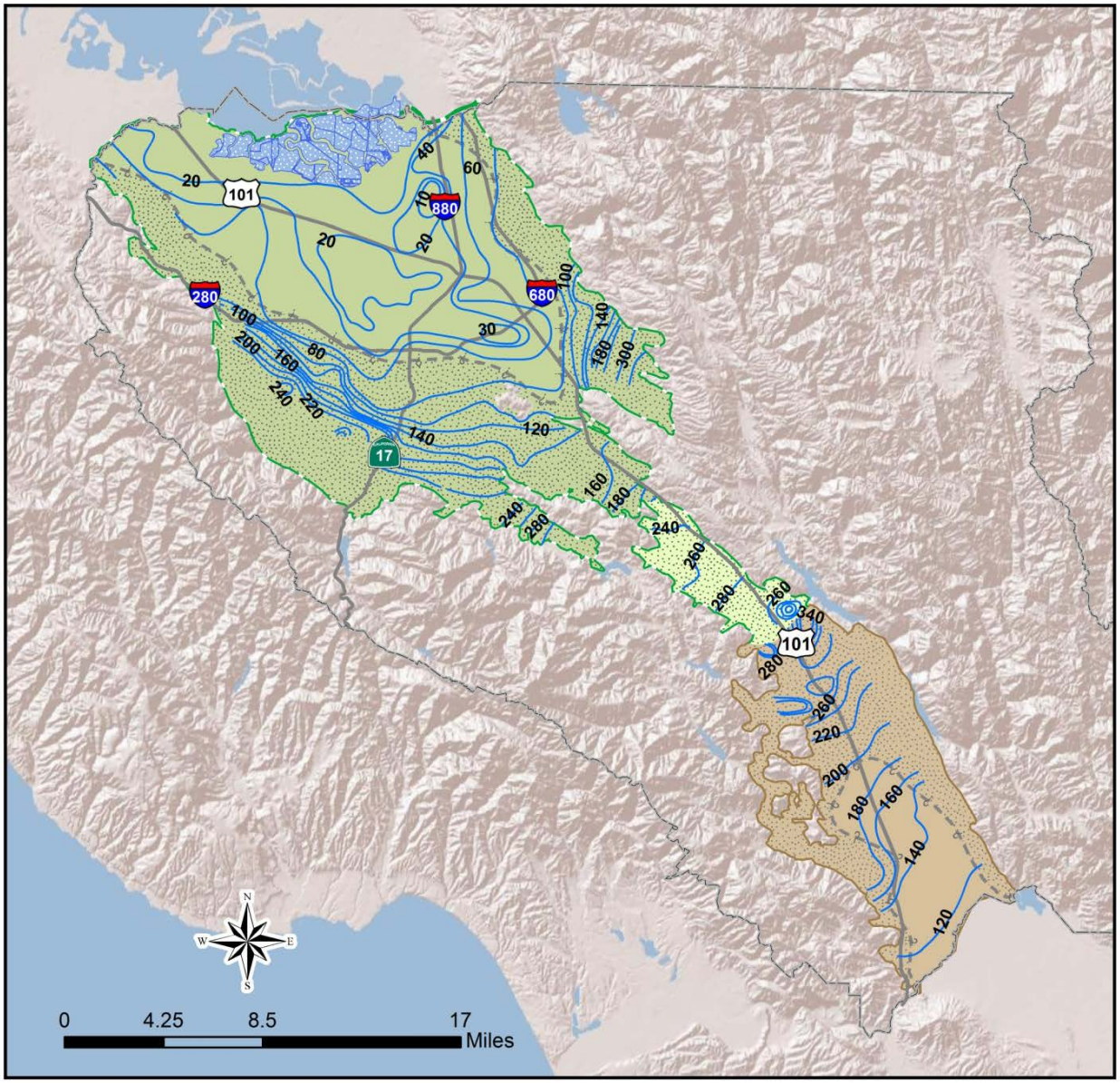
Figure 13 Spring 2013 Groundwater Contours



Groundwater Elevation Contour (feet above mean sea level)
Salt Ponds
Santa Clara County
Approximate Extent of Confined Area
Santa Clara Plain Confined Area
Santa Clara Plain Recharge Area
Coyote Valley Recharge Area
Llagas Confined Area
Llagas Recharge Area

Santa Clara Valley Water District

Figure 14 Fall 2013 Groundwater Contours



Groundwater Elevation Contour (feet above mean sea level)
Salt Ponds
Santa Clara County
Approximate Extent of Confined Area
Santa Clara Subbasin (DWR Basin 2-9.02)
Llagas Subbasin (DWR Basin 3-3.01)
Santa Clara Plain Confined Area
Santa Clara Plain Recharge Area
Coyote Valley Recharge Area
Llagas Confined Area
Llagas Recharge Area

Santa Clara Valley Water District

3.2 Groundwater Storage

Groundwater storage at the end of 2013 was above the GWMP outcome measure of 300,000 AF, but was 17,000 AF lower than 2012 (Table 6). End of year groundwater storage of less than 300,000 AF indicates a potential for water shortages per the District's Water Shortage Contingency Plan. Due to ongoing dry conditions and increased reliance on groundwater, the projected end of year storage for 2014 is below the 300,000 AF target. In accordance with the Water Shortage Contingency Plan, the District Board has set a 20% water use reduction target in 2014 to ensure fair groundwater reserves for 2015.

Table 6 Estimated End of Year Groundwater Storage (AF)

Groundwater Subbasin/Area	GWMP Outcome Measure	End of Year 2012	End of Year 2013	Change in Storage
Santa Clara Subbasin Santa Clara Plain	278,000	307,900	301,800	-6,000
Santa Clara Subbasin Coyote Valley	5,000	12,300	10,300	-2,000
Llagas Subbasin	17,000	36,000	27,100	-9,000
Total	**300,000**	**356,000**	**339,000**	**-17,000**

Note: Total storage and change in storage estimates are rounded to the nearest 500 AF.

Groundwater Storage Outcome Measures

OM 2.1.1.a.
Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain.

OM 2.1.1.b
Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley.

OM 2.1.1.c.
Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin.

These outcome measures were met for 2013, with estimated end of year storage of 301,800 AF in the Santa Clara Plain, 10,300 AF in the Coyote Valley, and 27,100 AF in the Llagas Subbasin.

Due to ongoing dry conditions and increased groundwater pumping, the outcome measures related to storage will not be met for 2014 unless water use is reduced in accordance with the Board of Directors 20% target.

4. LAND SUBSIDENCE

In 2013, the District measured subsidence at 145 benchmarks and two extensometers. Water levels at ten subsidence index wells were also monitored and compared to established thresholds. 2013 subsidence monitoring data indicates that thresholds established to minimize the risk of permanent land subsidence were met, indicating a low risk.

The Santa Clara Plain is vulnerable to land subsidence, with about 13 feet of inelastic (permanent) land subsidence observed in San Jose between 1915 and 1969 due to groundwater overdraft. Significant inelastic subsidence was essentially halted by about 1970 through the District's expanded conjunctive management programs, which allowed artesian heads to recover substantially. Some amount of elastic subsidence occurs annually in response to seasonal pumping and recharge as shown by extensometer measurements, traditional surveys, and by Interferometric Synthetic Aperture Radar (InSAR)[7] data. To avoid resumption of permanent inelastic subsidence, the District has established subsidence thresholds at ten index wells in the Santa Clara Plain[8]. A tolerable rate of 0.01 feet per year of subsidence[9] was used to determine the related minimum groundwater levels at these wells. These subsidence thresholds are the groundwater levels that must be maintained to ensure a low risk of land subsidence.

The District conducts ongoing monitoring of land surface elevation benchmarks, extensometers, and groundwater levels at subsidence index wells to determine if land subsidence is occurring or is threatening to exceed established thresholds. Subsidence monitoring points are shown in Figure 15. Monitoring results from extensometers, benchmark surveys, and subsidence index wells indicate a low risk of subsidence as described further below.

Extensometer Monitoring

The District monitors two 1,000 foot deep extensometers that measure vertical ground motion relative to a central, isolated pipe set beneath the water bearing units. The extensometers are located in Sunnyvale near Moffett Field ("Sunny") and near downtown San Jose ("Martha"), and are equipped with data loggers to provide hourly readings of land subsidence and water level. The District evaluates the average land subsidence measured during the last 11 years to determine if it meets the tolerable rate of land subsidence of 0.01 feet/year.

Figure 16 shows cumulative subsidence measured at the extensometers for the period of record supplemented with nearby benchmark data. This figure indicates land subsidence conditions have been relatively stable. The figure also shows the close correlation between the District's land subsidence model, which is used to forecast land subsidence and actual measured data. The average subsidence rate over the last 11 years (2003 to 2013) is 0.003 feet/year, which is below the tolerable subsidence rate of 0.01 feet/year. The average for the previous period (2002 to 2012) was negative 0.001 feet/year, indicating net land uplift. The change in land subsidence conditions from net uplift to compaction reflects groundwater level declines due to ongoing drought conditions. Measured compaction is within the elastic range observed historically, but vigilant land subsidence monitoring is critical as the current drought continues.

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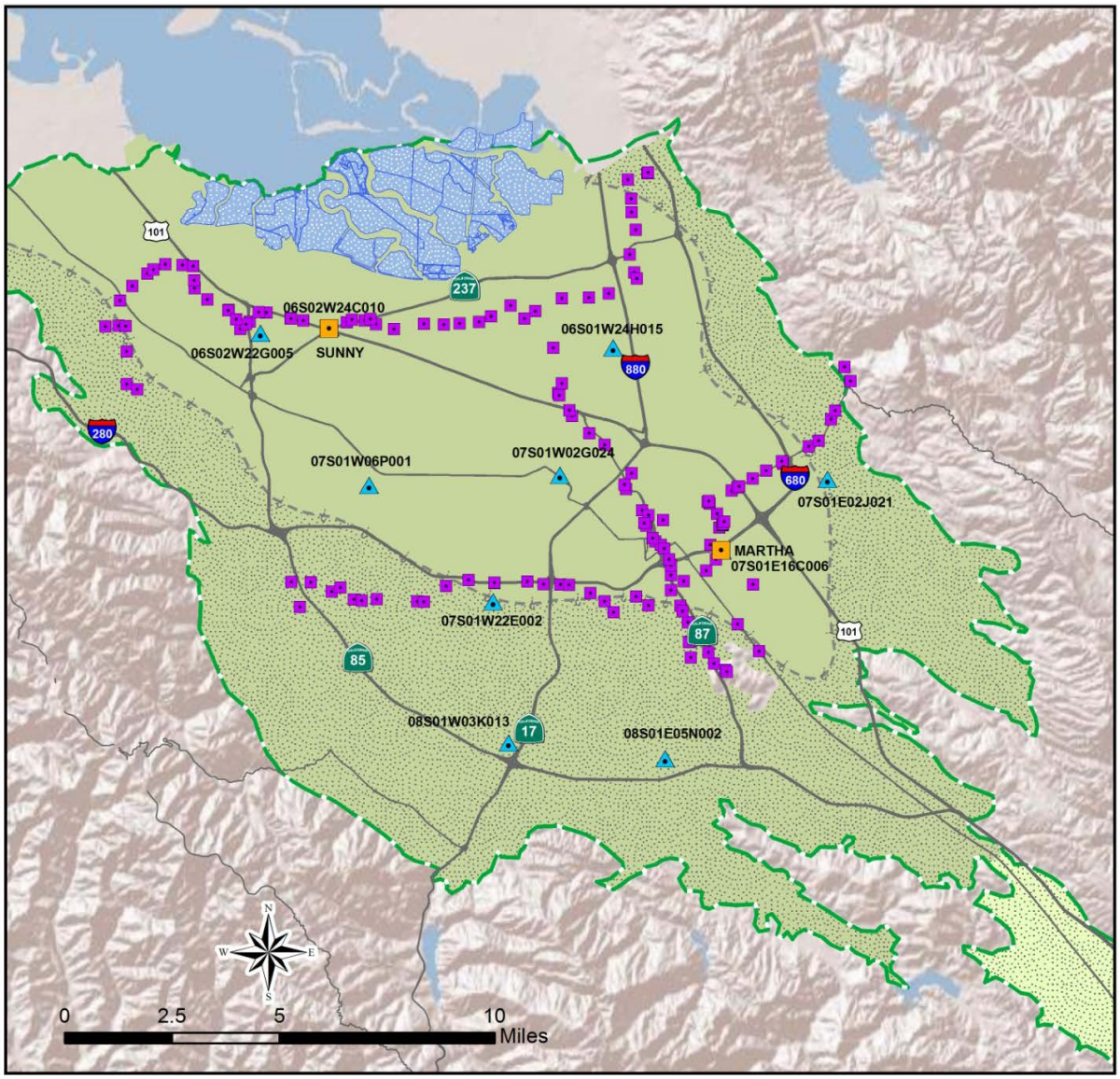
[7] Schmidt, D.A. and Burgmann, R., Time-Dependent Land Uplift and Subsidence in the Santa Clara Valley, California from a Large Interferometric Synthetic Aperture Radar Data Set, Journal of Geophysical Research, Volume 108, No. B9, 2003.

[8] Geoscience Support Services Inc. for Santa Clara Valley Water District, Subsidence Thresholds in the North County Area of Santa Clara Valley, 1991.

[9] The tolerable subsidence rate of no more than 0.01 feet per year on average was endorsed by the District's Water Retailer Groundwater Subcommittee.

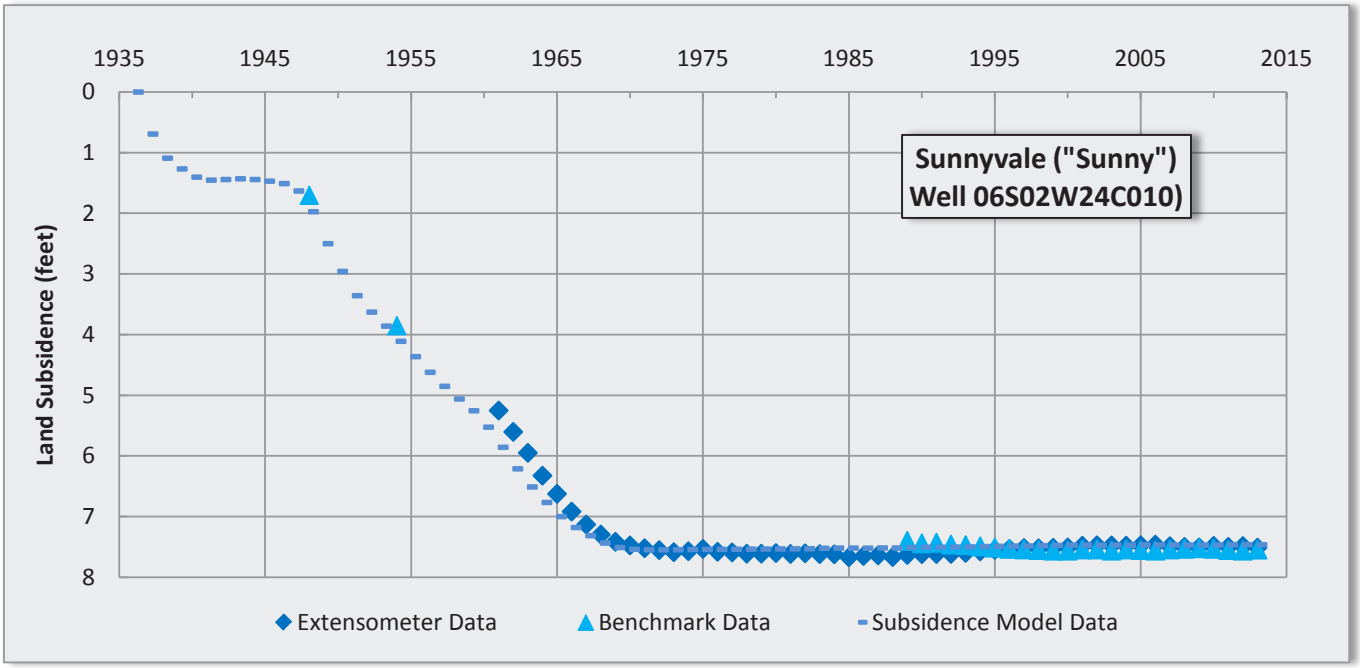
Figure 15 2013 Land Subsidence Monitoring

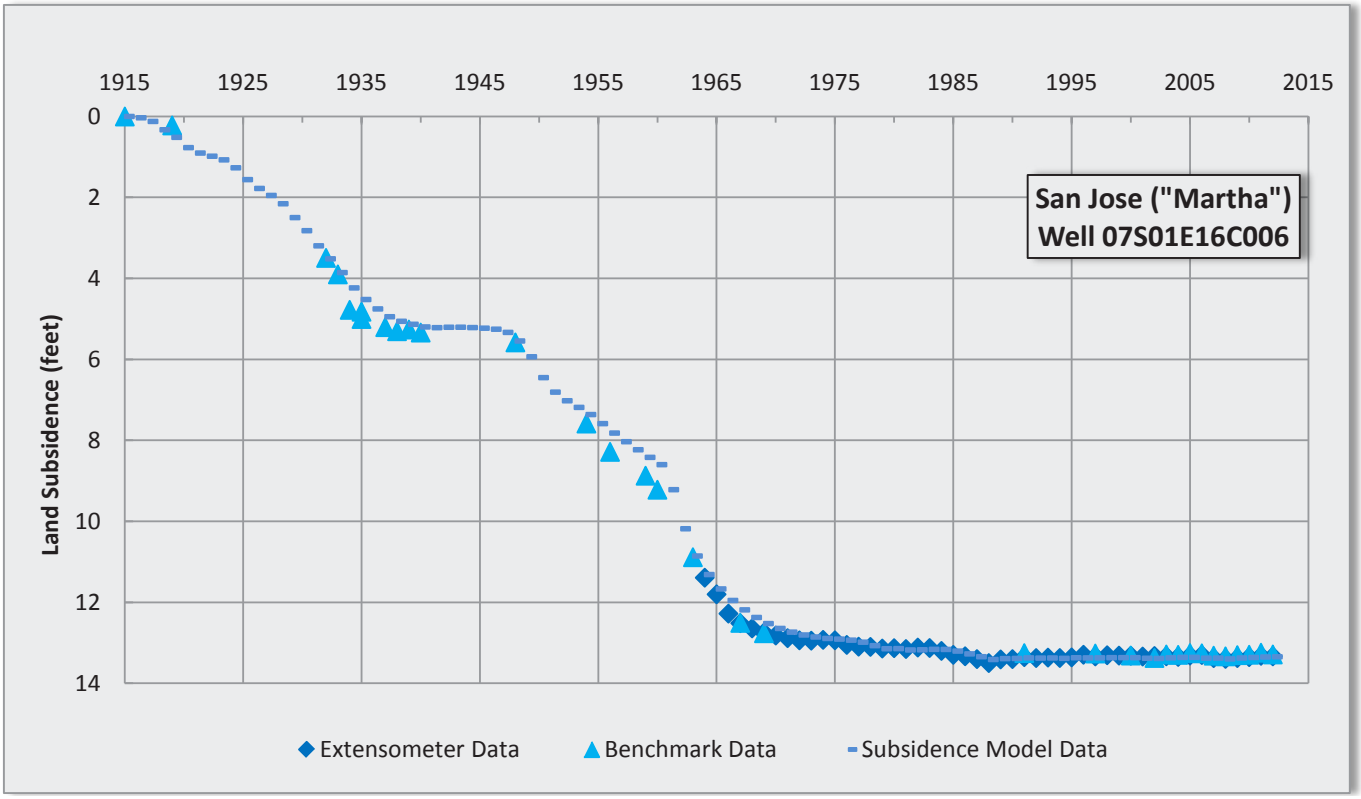


- 1000' Extensometer
- Benchmarks
- Subsidence Threshold Index Well
- Salt Ponds
- Approximate Extent of Confined Area
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area

Santa Clara Valley Water District

Figure 16 Cumulative Land Subsidence





Benchmark Elevation Surveys

Periodic surveys of land elevation have been conducted in Santa Clara County since 1934[10]. The District's current benchmark leveling program consists of annual surveys along three level circuits. In 2013, the District measured land surface elevation at 145 benchmarks throughout the Santa Clara Plain to evaluate the spatial variability of land subsidence. Regional benchmark data agrees with extensometer data, indicating the average annual change of land surface over the last 11 years does not exceed the tolerable rate of subsidence.

Subsidence Index Wells

Groundwater level measurements are an integral part of land subsidence monitoring because declining water levels due to long-term overdraft are the driving force of subsidence. The District measures water levels at ten subsidence index wells on a regular basis (daily to quarterly) to ensure they remain above established thresholds. If water levels drop below subsidence thresholds for extended periods, permanent land subsidence may resume, resulting in an increased risk of flooding and damage to infrastructure and utilities.

Figure 17 shows groundwater levels and subsidence thresholds at the ten subsidence index wells. The lowest historical water levels were generally observed in the 1960s and 1970s. Since then, groundwater levels have recovered, primarily due to the District's managed recharge and in-lieu recharge programs. Measured groundwater levels are consistently above subsidence thresholds from 2003 to 2013 at all index wells. The water level in the principal aquifer zone at three wells along San Francisco Bay (06S02W22G005, 06S02W24C010, and 06S01W24H015) is near or above the land surface, which helps prevent further land subsidence and keeps salt water from entering the Santa Clara Subbasin. The District will continue to frequently track data from the subsidence index wells and consider this information in water supply operations and planning.

Land Subsidence Outcome Measure

OM 2.1.1.d.
100% of subsidence index wells with groundwater levels above subsidence thresholds.

The outcome measure is met as groundwater levels were above subsidence thresholds at all ten index wells throughout calendar year 2013.

[10] USGS, Land Subsidence in the Santa Clara Valley, California as of 1982, Professional Paper 497-F, 1988.

Figure 17 Groundwater Levels at Subsidence Index Wells (feet above mean sea level)

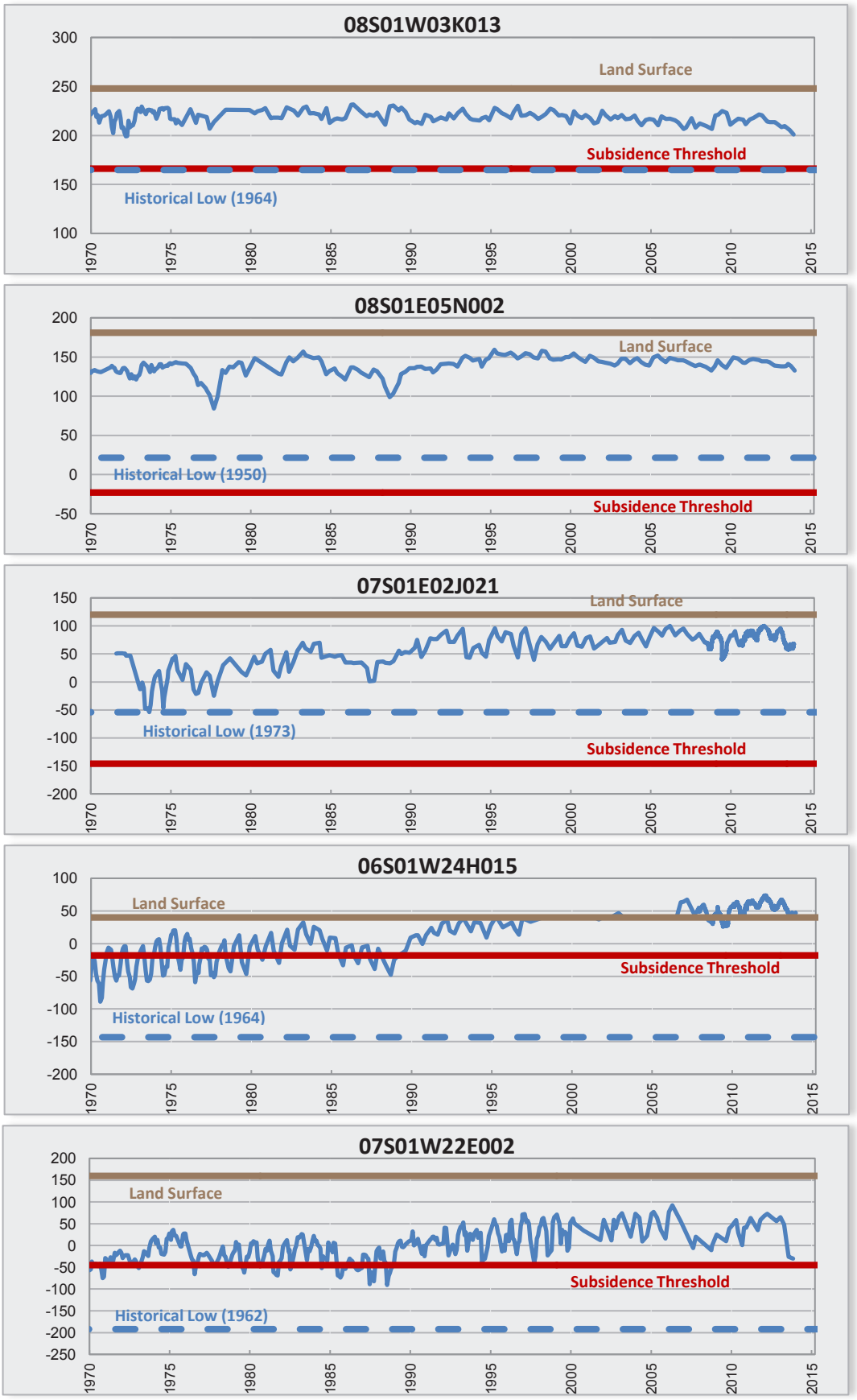
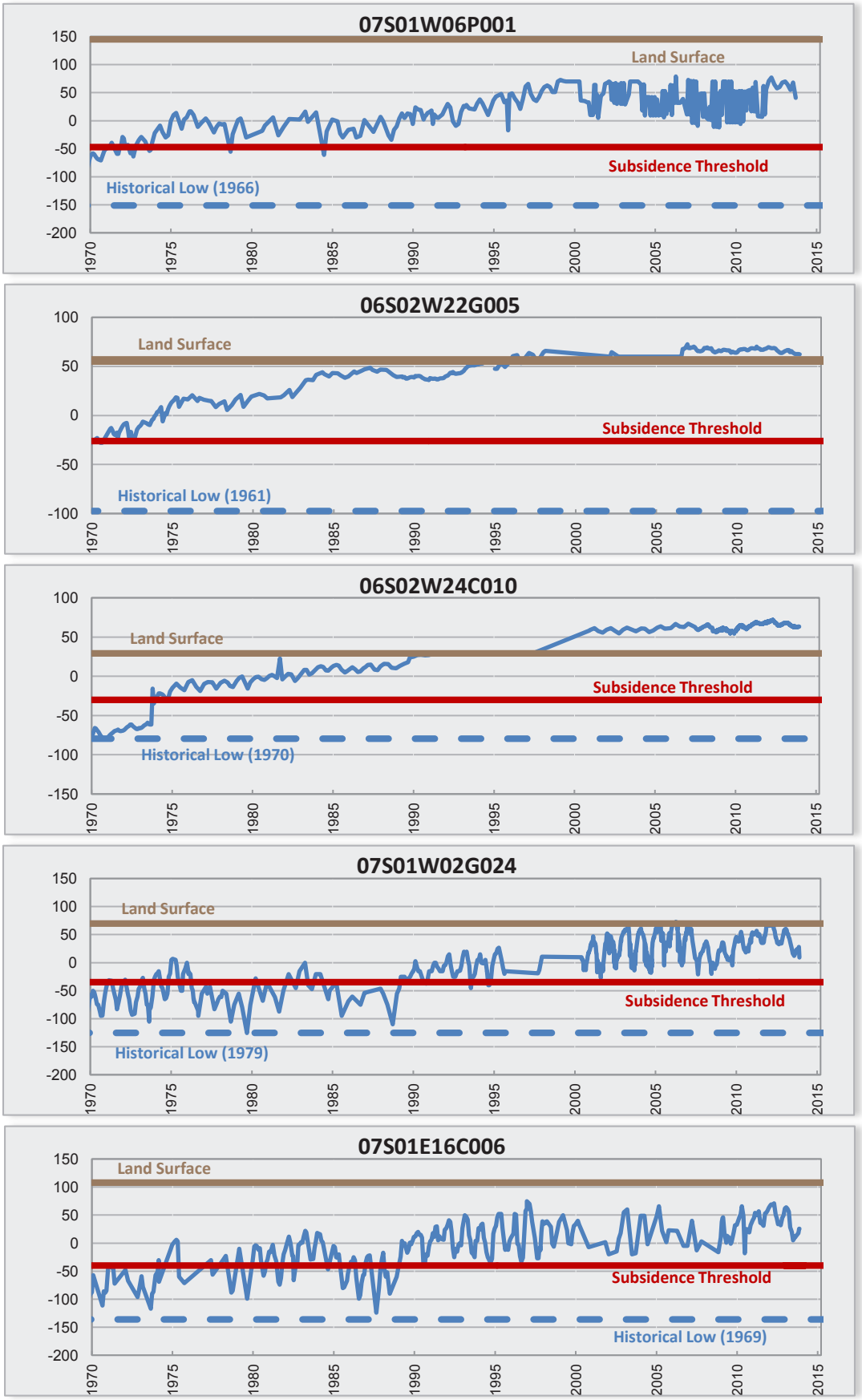


Figure 17 Groundwater Elevation at Subsidence Index Wells, continued (ft above mean sea level)



5. GROUNDWATER QUALITY

In 2013, the District tested groundwater quality at nearly 400 wells, including monitoring wells, more than 300 domestic wells, and 22 wells near recycled water irrigation sites. The District also monitored recharge water quality at 12 locations. Groundwater in the Santa Clara and Llagas Subbasins is generally of very high quality. The main exception is nitrate, which is elevated in about 30% of South County water supply wells (primarily domestic) due to historic and ongoing sources. To address nitrate loading, the District is working with basin stakeholders to complete Salt and Nutrient Management Plans in 2014. The District is also offering rebates for nitrate treatment systems for domestic well users to reduce consumer exposure.

Results from District monitoring at the Coyote and West Side recharge systems indicate the recharge water quality is generally similar to or better than the underlying groundwater quality. Chloride content was observed to increase at some Coyote recharge facilities as the year progressed. The managed recharge systems sampled do not appear to be impacted by anthropogenic contaminants typically carried in runoff.

Groundwater monitoring near recycled water irrigation sites shows some increasing trends for salts, as well as low-level detections of disinfection by-products and other constituents. The District will continue to track water quality changes and work with stakeholders to identify ways to minimize the risk of groundwater contamination.

5.1 Regional Groundwater Quality

The District sampled groundwater quality at 63 wells, including 43 monitoring wells and 20 domestic wells (Figure 18)[11]. Each sample was analyzed for approximately 110 parameters including major and minor ions, nutrients, trace metals, and volatile organic compounds (VOCs). The District also evaluated data from 221 public water supply wells sampled by water retailers and reported to the State Water Resources Control Board Division of Drinking Water (DDW)[12].

To evaluate regional water quality conditions, the District evaluated parameter median and range for each subbasin and aquifer zone[13] (Appendix B). Results indicate groundwater in the Santa Clara and Llagas Subbasins is generally of high quality. Water quality indicators, ions, and trace elements were within the normal range expected in groundwater, with the exception of nitrate. Elevated nitrate is primarily an issue in South County due to historic and ongoing sources including synthetic fertilizer, septic systems, and animal enclosures. Very few VOCs were detected at any wells, with only one sample containing a solvent above drinking water standards.

The median values for Total Dissolved Solids (TDS), which is generally used to characterize salts, and nitrate are presented in Table 7 below. As shown, the median concentration of nitrate and TDS for each area and aquifer zone is similar to last year. Minor fluctuations in water quality are expected due to variation in the wells tested each year and variations in recharge, pumping, and rainfall.

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[11] The District also collected limited water quality data at over 300 domestic wells in 2013 as part of the Domestic Well Testing Program. Data from 48 domestic wells with available well construction information are summarized in this section. The results for all domestic wells are summarized in Section 5.3.

[12] Formerly the California Department of Public Health (CDPH).

[13] Public water supply wells were assumed to represent the principal aquifer if no construction information water available as these are typically deep wells.

Comparison to Drinking Water Standards

With the exception of nitrate, 99% of water supply wells tested (including public water supply wells and domestic wells) met all health-based drinking water standards; this drops to 79% if nitrate is included. The only parameters detected above the MCL in North County water supply wells were aluminum (at two wells) and 1,1-DCE at one well (Figure 19). It is not uncommon to see a small number of wells with metals above the MCL, likely due to localized geologic conditions. Subsequent testing at the well with elevated 1,1-DCE indicated levels dropped below the drinking water standard. Nearly 30% of South County water supply wells tested contained nitrate above the MCL of 45 milligrams per liter (mg/L). Most of these detections were from private domestic wells that are not regulated by the state. Public water systems must comply with drinking water standards, which may require treatment or blending prior to customer delivery.

Table 7 Median Nitrate and TDS by Subbasin and Aquifer Zone (mg/L)

Parameter	Santa Clara Subbasin						Llagas Subbasin			
	Santa Clara Plain Shallow Aquifer		Santa Clara Plain Principal Aquifer		Coyote Valley		Shallow Aquifer		Principal Aquifer	
	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012
Nitrate (as NO_3)	4.8	3.3	14	12.4	17.6	10.6	30.7	40.5	22	24
TDS	491	456	410	395	330	358	409	422	360	340

1) The shallow and principal aquifer zones are represented by wells primarily drawing water from depths less than and greater than 150 feet, respectively.
2) Nitrate has a health-based MCL of 45 mg/L. TDS has an aesthetic-based MCL, which ranges from 500 to 1,000 mg/L (recommended and upper limit, respectively).
3) Table includes information for monitoring wells, public water supply wells, and domestic wells for which construction information is available. The set of wells sampled each year varies.

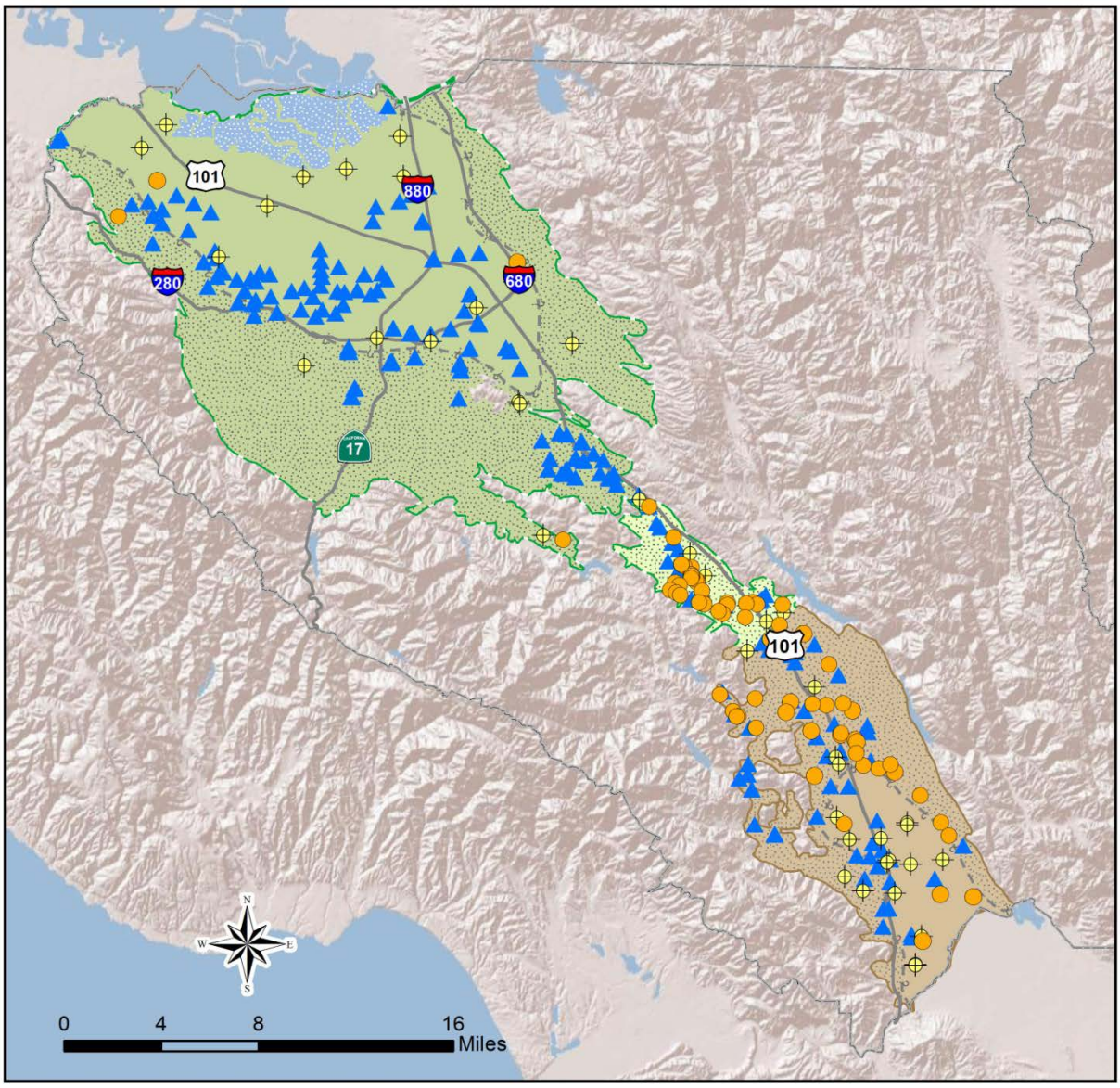
While not used as a source of drinking water, some monitoring wells sampled tap the potable aquifer zone. No contaminants were detected above health-based standards for these deep monitoring wells. Some shallow aquifer zone monitoring wells were affected by nitrate (seven wells) and arsenic (one well).

Comparison to Agricultural Objectives

South County groundwater quality was evaluated against agricultural water quality objectives identified in the applicable Regional Water Quality Control Board Basin Plans[6] to assess its suitability for agricultural uses. Because the District has limited access to agricultural wells, water quality data collected from water supply wells were utilized in this evaluation. Ninety-nine percent of South County water supply wells met Basin Plan agricultural objectives. In Coyote Valley, all wells met the objectives except one well for nitrate. In the Llagas Subbasin, two wells did not meet the nitrate objective.

[6] Groundwater in the Coyote Valley is compared to the limits shown in Table 3-6 of the San Francisco Bay Basin (Region 2) Water Quality Control Plan (December 2011) and groundwater in the Llagas Subbasin is compared to Table 3-3 (using the upper end of the "increasing problems" range) and Table 3-4 (irrigation supply) of the Water Quality Control Plan for the Central Coast Basin (June 2011).

Figure 18 2013 Groundwater Quality Monitoring

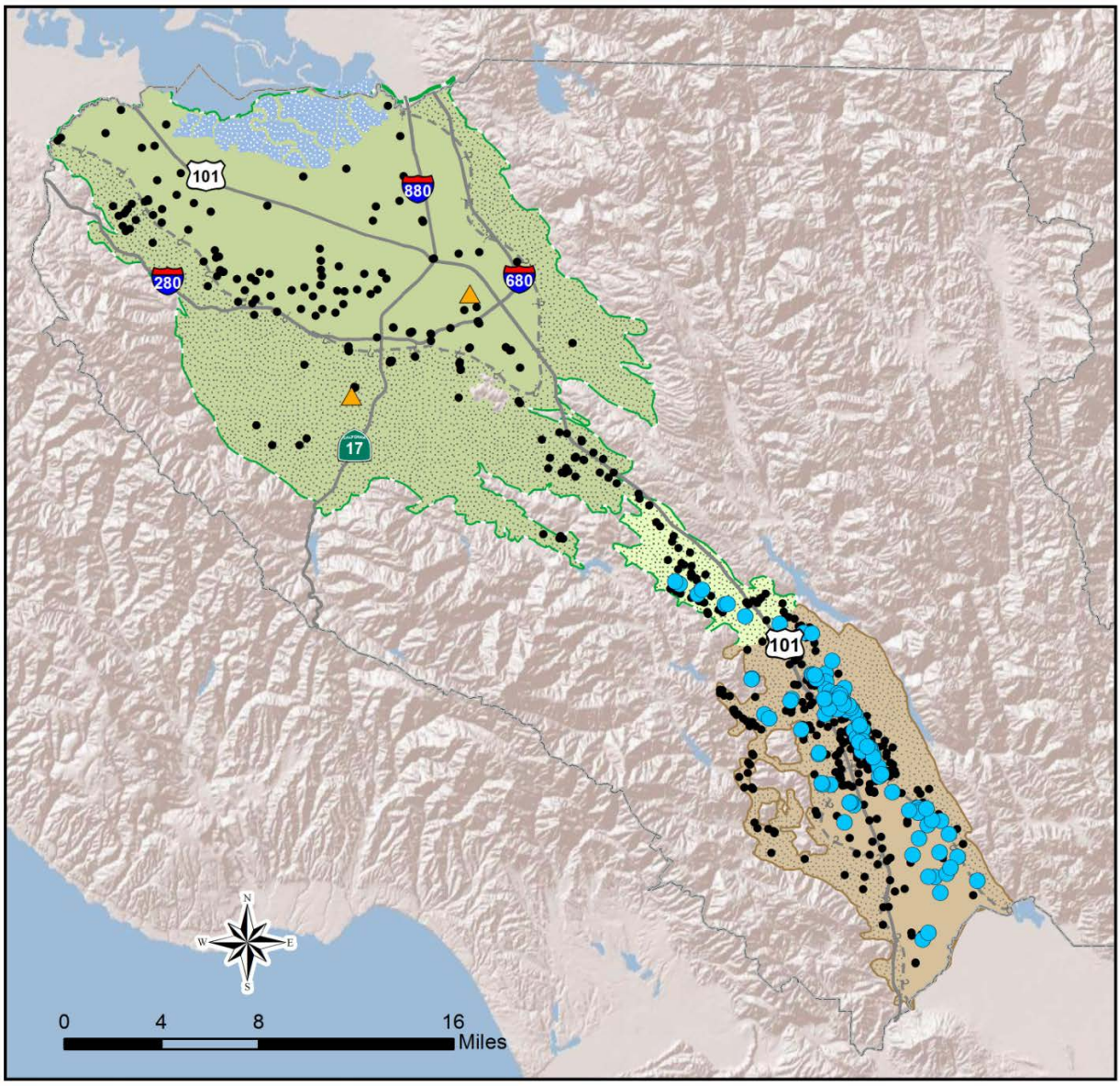


Well Type

- Water Supply (Sampled by Public Water Retailers)
- Monitoring
- Domestic Wells
- Santa Clara County
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Salt Ponds
- Approximate Extent of Confined Area
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

Figure 19 2013 Water Supply Well Results with Regard to Primary Drinking Water Standards



- Meets all standards
- 1,1-Dichloroethene
- Aluminum
- Nitrate (as NO3)
- Santa Clara County
- Salt Ponds
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent of Confined Area
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

5.2 Groundwater Quality Trends

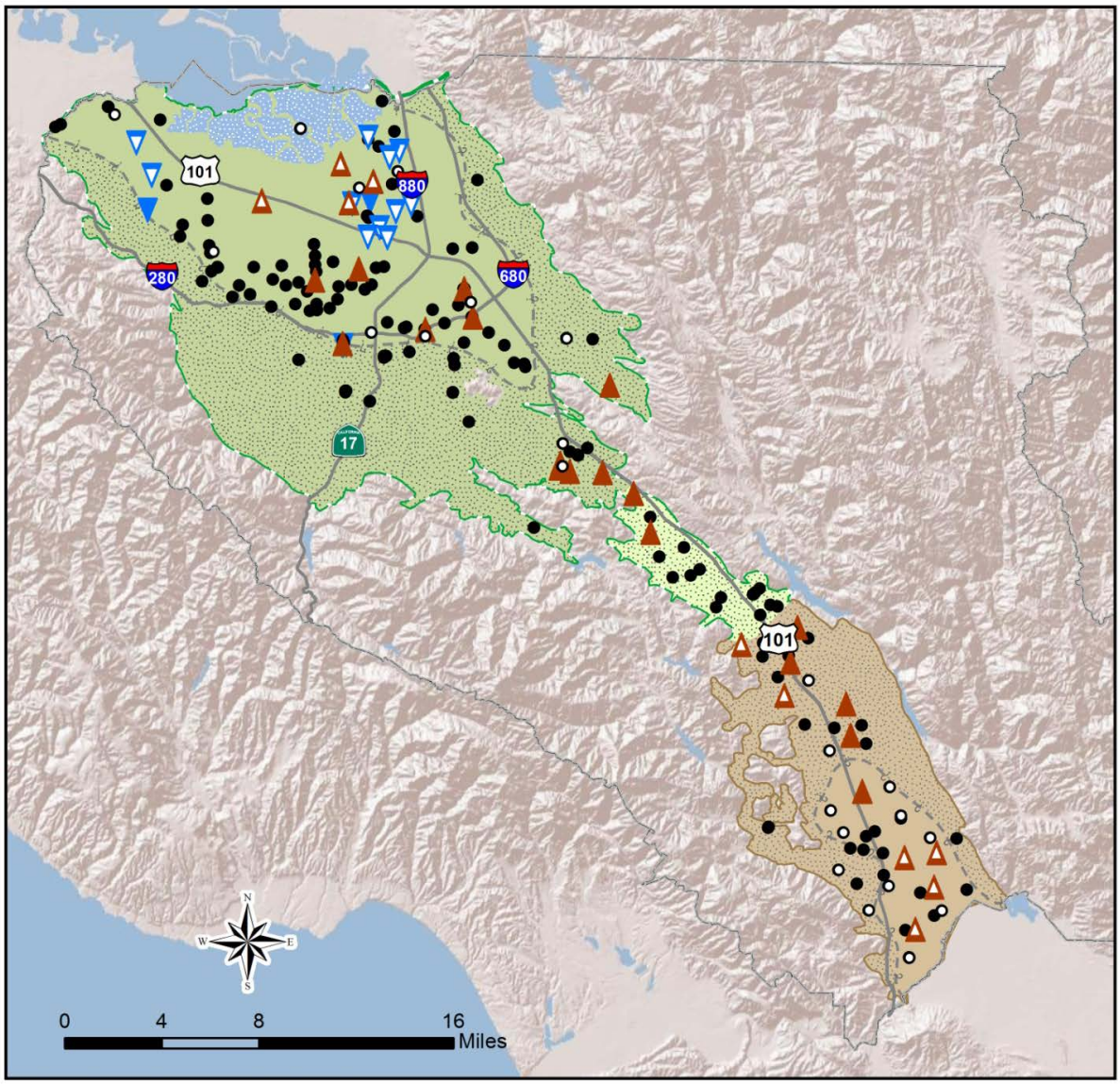
To assess changes in water quality over time, the District evaluated statistical trends for chloride, nitrate, and TDS for each area and aquifer zone. Trend evaluation was performed for all wells (including water supply and monitoring wells) with at least 5 results over the last fifteen years (1999 through 2013). The results are shown in Figures 20 through 22 and are summarized in Table 8, which indicates the majority of wells show a stable or decreasing trend.

Table 8 Chloride, Nitrate, and TDS Trends (1999 – 2013)

Groundwater Management Area	Parameter	Number of Wells Evaluated	Percent Wells with Stable or Decreasing Trend	Number of Wells with Increasing Trend
Santa Clara Plain Shallow Aquifer	Chloride	26	85%	4
	Nitrate (as NO_3)	19	89%	2
	TDS	18	89%	2
Santa Clara Plain Principal Aquifer	Chloride	149	93%	11
	Nitrate (as NO_3)	243	95%	12
	TDS	143	97%	4
Coyote Valley	Chloride	16	88%	2
	Nitrate (as NO_3)	30	90%	3
	TDS	17	76%	4
Llagas Subbasin Shallow Aquifer	Chloride	19	68%	6
	Nitrate (as NO_3)	23	83%	4
	TDS	19	84%	3
Llagas Subbasin Principal Aquifer	Chloride	38	87%	5
	Nitrate (as NO_3)	107	93%	8
	TDS	37	100%	0
All Groundwater Management Areas	Chloride	248	89%	28
	Nitrate (as NO_3)	422	93%	29
	TDS	234	94%	13

In general, there is no clear spatial pattern for wells with increasing trends in chloride, as in most cases nearby wells have stable or decreasing trends (Figure 20). There is a cluster of shallow wells in the area historically affected by salt water intrusion with decreasing trends. Nitrate is generally stable or decreasing throughout the county, and a cluster of wells with decreasing trends is observed in the southern portion of the Santa Clara Plain near the Coyote Valley (Figure 21). This may be the result of dilution from the managed recharge of water with low nitrate content through Coyote Creek. Though less well-defined, another cluster of wells with an upward nitrate trend is observed in the downtown area of San Jose. Only a small percentage of wells had increasing trend for TDS, yet an increase in wells with upward trends were noted since last year.

Figure 20 Chloride Trends (1999 – 2013)



Trends

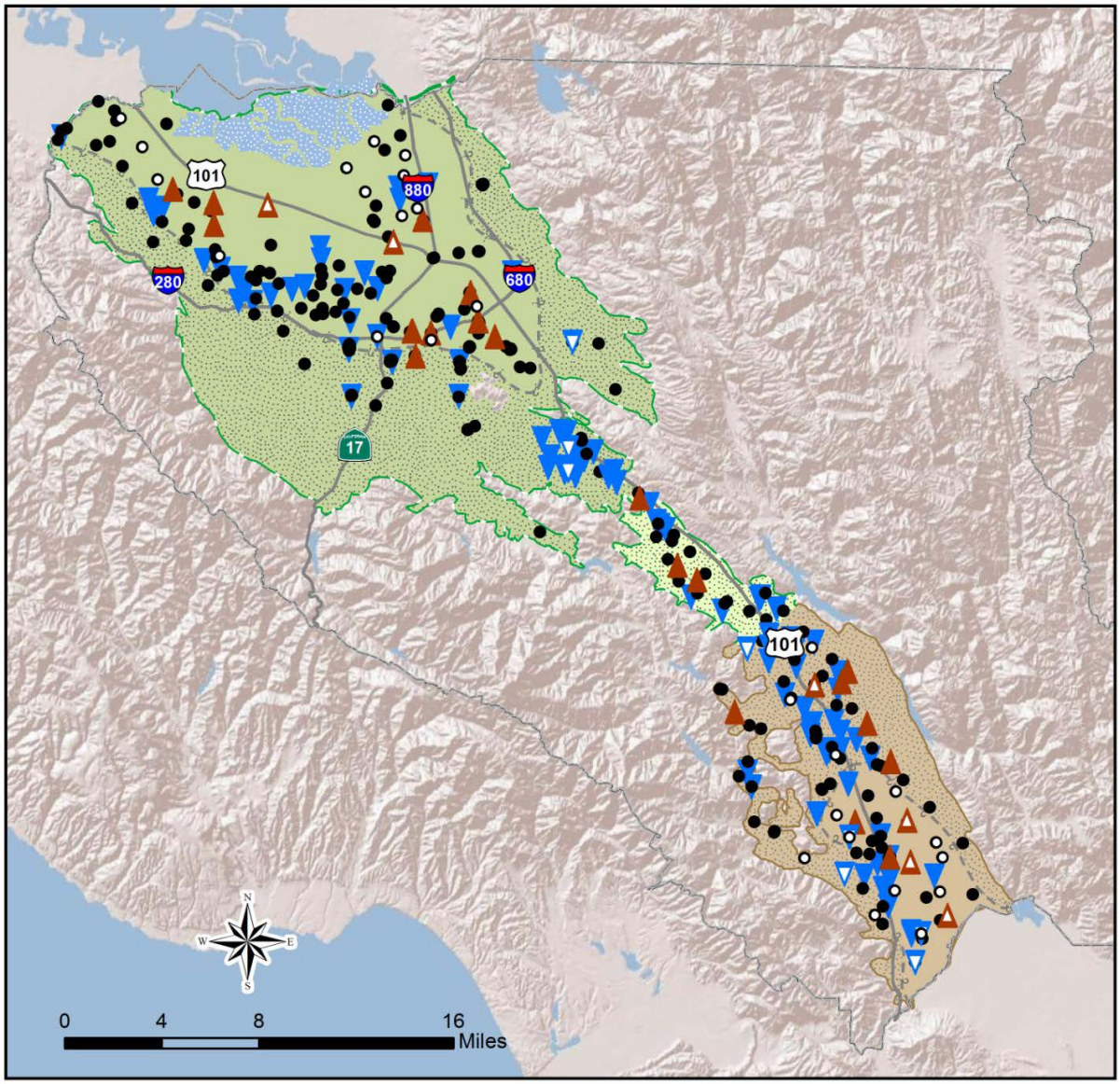
- Decreasing (Principal Aquifer)
- Decreasing (Shallow Aquifer)
- Increasing (Principal Aquifer)
- Increasing (Shallow Aquifer)
- Stable (Shallow Aquifer)
- Stable (Principal Aquifer)

- Santa Clara County
- Salt Ponds
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent of Confined Area

- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

Figure 21 Nitrate Trends (1999 – 2013)

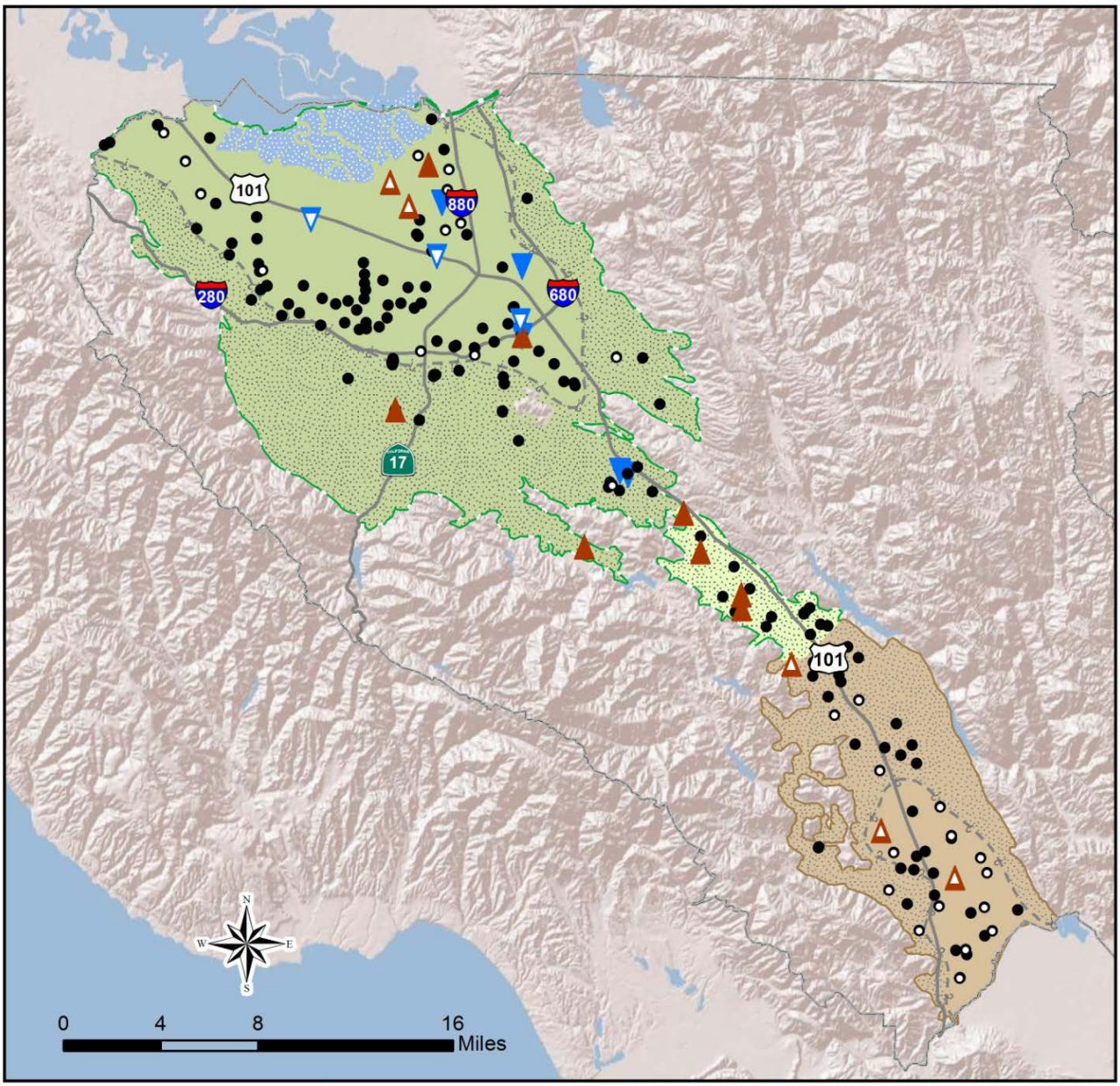


Trends

- Decreasing (Principal Aquifer)
- Decreasing (Shallow Aquifer)
- Increasing (Principal Aquifer)
- Increasing (Shallow Aquifer)
- Stable (Shallow Aquifer)
- Stable (Principal Aquifer)
- Santa Clara County
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Salt Ponds
- Approximate Extent of Confined Area
- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

Figure 22 Total Dissolved Solids (TDS) Trends (1999 – 2013)



Trend

- Decreasing (Principal Aquifer)
- Decreasing (Shallow Aquifer)
- Increasing (Principal Aquifer)
- Increasing (Shallow Aquifer)
- Stable (Shallow Aquifer)
- Stable (Principal Aquifer)

- Santa Clara County
- Salt Ponds
- Santa Clara Subbasin (DWR Basin 2-9.02)
- Llagas Subbasin (DWR Basin 3-3.01)
- Approximate Extent of Confined Area

- Santa Clara Plain Confined Area
- Santa Clara Plain Recharge Area
- Coyote Valley Recharge Area
- Llagas Confined Area
- Llagas Recharge Area

Santa Clara Valley Water District

5.3 Domestic Well Water Quality

In addition to regional monitoring to assess groundwater conditions, the District offers basic water quality testing program to eligible domestic well owners within the District's groundwater charge zones. In 2013, the District tested 26 domestic wells in North County and 286 wells in South County for basic water quality parameters including nitrate, bacteria, electrical conductivity, and hardness.

Domestic well data helps improve the District's understanding of the occurrence of common contaminants. This data also provides important information that helps well owners better protect their health. Although private domestic wells are not regulated by the state, the comparison to state drinking water standards provides context for results. Table 9 summarizes the results for each zone, including the median and percent of wells above drinking water standards.

Nitrate was detected above the health-based MCL at 34% of domestic wells tested in South County, with a median concentration of 33.1 mg/L. This is higher than the regional median values for the Coyote Valley and Llagas Subbasin, which are 17.6 and 22 mg/L, respectively. The higher median in domestic wells may be due to various factors including differences in well construction. Public water systems, which are included in the regional median, generally have more flexibility in blending or switching sources when concentrations approach the MCL.

Countywide, total coliform bacteria were detected in 33% of the domestic wells tested. Coliform bacteria are naturally present in humans, animals, and the environment and do not normally cause illness, but they should not be present in drinking water. Escherichia coli (E. coli), a type of bacteria indicative of fecal contamination, were detected in 1% of the domestic wells tested countywide. Total coliform and E. coli detections appear randomly distributed.

District staff informed the well owner promptly and provided relevant information if any contaminants were detected above drinking water standards or if bacteria were present. All participants were mailed a copy of the certified laboratory report. Based on survey results, participants were very satisfied with the testing program, with nearly all survey questions receiving overwhelmingly positive results. The majority of respondents would like testing to be offered on an annual basis.

The continued presence of nitrate above the MCL in many domestic wells highlights the need for continued efforts to reduce well owners' exposure to nitrate. The District began implementation of a multi-year rebate program for nitrate treatment systems in the fall of 2013. This effort complements outreach and other efforts to reduce nitrate loading in coordination with the Central Coast Water Board and other basin stakeholders.

Table 9 2013 Domestic Well Testing Results

Parameter and Units	MCL[1]	Zone W-2 North County		Zone W-5 South County	
		Median	Wells above MCL[1] (%)	Median	Wells above MCL[1] (%)
Nitrate (mg/L)	45 (P)	7.7	4%	33.1	34%
Fluoride (mg/L)	2 (P)	0.15	0%	0.13	0%
Electrical Conductivity (uS/cm)	900 (S)	698	28%	669	14%
Sulfate (mg/L)	250 (S)	35.98	4%	35.95	0%
Hardness (mg/L as CaCO3)	--	251	--	257	--
		Wells with Bacteria Present (No.)	Wells with Bacteria Present (%)	Wells with Bacteria Present (No.)	Wells with Bacteria Present (%)
Total Coliform Bacteria	--[2]	14	54%	88	31%
E. Coli Bacteria	--[2]	1	4%	1	<1%

Notes:

1) Maximum contaminant levels are established by the State Division of Drinking Water (DDW) for public water systems. (P) indicates the parameter has a health-based primary MCL and (S) indicates a secondary, aesthetic-based MCL. Hardness does not have a primary or secondary MCL but water with hardness above 180 mg/L is classified as very hard. Water quality in domestic wells is not regulated by the state.
2) Bacteria are measured as present or absent. Public water systems are required to ensure that fewer than 5% of samples have total coliform present and that no samples have E. Coli present.

5.4 Recharge Water Quality

The District monitors surface water quality at selected in-stream and off-stream recharge facilities to characterize recharging water quality and assess how groundwater quality may be influenced by managed recharge. Monitoring is conducted in accordance with the District's Recharge Water Quality Monitoring Plan,[1] which requires sampling each recharge system every three years.

In 2013, the District monitored 12 facilities in the West Side and Coyote recharge systems in January, March, and August (Table 10). Samples were analyzed for major and minor ions, trace elements, and select organic compounds. Testing of organic compounds was conducted at recharge facilities located near potentially contaminating sources (e.g., industrial and automotive chemical sources or herbicide/pesticide application areas) to evaluate potential impacts from runoff during the wet sampling event in January 2013. The other two sampling events in March and August were dry events and did not include organic compounds. The source of managed recharge water at each facility varies, and may consist of imported water, local water, or a blend of the two.

[1] Santa Clara Valley Water District, Recharge Water Quality Monitoring Plan, September 2012.

Table 10 2013 Recharge Water Quality Sampling Locations

Recharge System	Facilities Sampled
West Side	Stevens Creek (3 locations), Saratoga Creek (1 location)
Coyote	Coyote Creek (5 locations), Coyote Pond (2 locations), Main Avenue Pond (1 location)

Although managed recharge water is not suitable for direct consumption before treatment or infiltration, comparing it to drinking water standards provides context for results. No parameters were detected above health-based drinking water standards in any of the recharge water samples. Turbidity was the only parameter detected above its aesthetic-based drinking water standard at the majority of stations in the West Side System and at a few stations within the Coyote System. No volatile or semi-volatile organic compounds (including pesticides) were detected in any samples.

Key water quality indicators for salinity, non-point source pollution, and trace metals are compared against background groundwater concentrations. Recharge water quality is generally good, with most indicators similar to or better than the receiving water throughout the year (Tables 11 and 12). Measured chloride levels from the Coyote Recharge System are well below the secondary MCL of 250 mg/L, but are higher than ambient groundwater in later sampling events. Similar chloride levels have been observed in the Coyote system in previous sampling events, and may be indicative of existing system conditions. Managed recharge water for both systems has relatively low levels of nitrate, which helps to dilute nitrate in groundwater.

Table 11 Key Water Quality Indicators, West Side Recharge System

Parameter	Units	January 2013	March 2013	August 2013	MCL	SMCL	Typical Groundwater Concentration
TDS	mg/L	314	254	361	-	500	410
Total Alkalinity (as CaCO3)	mg/L	166	180	230.5	-	-	220
Chloride	mg/L	19	19	27	-	250	45
Sulfate	mg/L	35.7	34.9	32.95	-	250	44
pH	pH units	8.12	7.96	8.09	-	6.6-8.5	7.4
Nitrate (as NO3)	mg/L	1.11	0.68	1.44	45	-	14
Aluminum	ug/L	<20	<20	<20	1000	200	21
Iron	ug/L	<20	<20	<20	-	300	29.4

Notes:
1) Table contains the median value for all stations sampled within the recharge system.
2) Typical groundwater concentration is the 2013 median for the principal zone of the Santa Clara Plain.

Table 12 Key Water Quality Indicators, Coyote Recharge System

Parameter	Units	January 2013	March 2013	August 2013	MCL	SMCL	Typical Groundwater Concentration
TDS	mg/L	305	290	301	-	500	330
Total Alkalinity (as CaCO3)	mg/L	164	134	106.5	-	-	180
Chloride	mg/L	30.5	51	71	-	250	40
Sulfate	mg/L	46.75	43.1	40.5	-	250	42
pH	pH units	7.90	8.04	8.04	-	6.6-8.5	7.38
Nitrate (as NO3)	mg/L	4.37	2.04	0.16	45	-	17.6
Aluminum	ug/L	<20	<20	<20	1000	200	32.6
Iron	ug/L	<20	<20	<20	-	300	<20

Notes:
1) Table contains the median value for all stations sampled within the recharge system.
2) Typical groundwater concentration is the 2013 median for the Coyote Valley.

5.5 Monitoring Near Recycled Water Irrigation Sites

The District partners with the four recycled water producers in the county[14] to expand recycled water use. Recycled water is used for non-potable uses like large landscape irrigation, agriculture, and industry. Tertiary treated recycled water generally has a higher concentration of salts, nutrients, disinfection by-products, and emerging contaminants than local groundwater or treated water[15]. These contaminants may be introduced to groundwater through landscape irrigation and previous studies near recycled water irrigation sites have noted evidence of significant recycled water contribution to shallow wells[16].

In 2011, the District completed the Recycled Water Irrigation and Groundwater (RWIG) Study[17] which included a field study at a site using recycled water for irrigation. The study did not find significant changes in groundwater quality for most constituents following recycled water irrigation. However, several constituents were detected at low levels, including perfluorochemicals (PFCs) and N-Nitrosodimethylamine (NDMA, a disinfection by-product (DBP). The study findings suggested that best management practices and/or changes in recycled water treatment may be warranted in sensitive groundwater areas.

The District is working with South Bay Water Recycling (SBWR), to improve recycled water quality for irrigation and other uses. Recycled water provided by SBWR is now being blended with highly purified water from the District's Silicon

[14] Recycled water is produced at the Palo Alto Regional Water Quality Control Plant, San Jose/Santa Clara Water Pollution Control Plant (WPCP), the Sunnyvale WPCP and the South County Regional Wastewater Authority.
[15] Advanced Recycled Water Treatment Feasibility Project, Black & Veatch, Kennedy/Jenks for the Santa Clara Valley Water District, August 2003.
[16] California GAMA Program: Fate and Transport of Wastewater Indicators: Results from Ambient Groundwater and from Groundwater Directly Influenced by Wastewater, Lawrence Livermore National Laboratory and California State Water Resources Control Board, June 2006.
[17] Locus Technologies for Santa Clara Valley Water District, Recycled Water Irrigation and Groundwater Study, Santa Clara and Llagas Groundwater Subbasins, Santa Clara County, California, August 2011.

Valley Advanced Water Purification Center. This facility produces up to eight million gallons of highly purified water a day using microfiltration, reverse osmosis, and ultraviolet light.

To help ensure groundwater quality is protected, the District evaluates potential changes in groundwater quality near sites irrigated with tertiary treated recycled water. The District conducts monitoring at three sites (one in the Santa Clara Subbasin and two in the Llagas Subbasin) and also evaluates data collected by others as shown in Table 13. Statistical analysis of trends and geochemical methods are used to evaluate water quality changes.

As shown in Table 14, monitoring results at several sites show increasing trends for salts and low-level detections of NDMA, PFCs, and other constituents. In most cases, these contaminants were not present prior to the use of recycled water. There is also some evidence that recycled water is mixing with shallow groundwater based on the geochemical analysis of groundwater, which appears to be shifting toward that of recycled water in several wells. Based on the lines of evidence mentioned here, it is likely that changes in shallow groundwater quality are occurring as a result of irrigation with recycled water.

Table 13 2013 Groundwater Monitoring near Recycled Water Irrigation Sites

Subbasin	Location	Sampling Agency	Sampling Summary
Santa Clara Subbasin	Integrated Device Technology (IDT) Campus, Edenvale area of San Jose	IDT and District	• Four shallow monitoring wells were sampled in March and September. • Parameters analyzed include basic water quality parameters, ions, disinfection by-products (DBPs), perfluorochemicals (PFCs), bacterial parameters, and others commonly encountered in treated recycled water.
	Various Locations in San Jose	City of San Jose	• Six shallow and five deep wells were monitored in San Jose in February as part of the City's Groundwater Mitigation and Monitoring Plan (GMMP). • Parameters analyzed include basic salts and minerals, alkalinity and TDS.
Llagas Subbasin	Christmas Hill Park, Gilroy	District	• Three shallow monitoring wells were monitored quarterly. • Parameters analyzed include basic water quality parameters, ions, disinfection by-products (DBPs), perfluorochemicals (PFCs), bacterial parameters, and others commonly encountered in treated recycled water.
	Irrigated Land Near SCRWA Plant, Gilroy	District	• Four shallow monitoring wells were monitored quarterly. • Parameters analyzed include basic water quality parameters, ions, disinfection by-products (DBPs), perfluorochemicals (PFCs), bacterial parameters, and others commonly encountered in treated recycled water.

Table 14 Key Findings from Recycled Water Irrigation Site Monitoring

Subbasin	Location	Highlights
Santa Clara Subbasin	IDT	• Basic chemical composition is stable compared to previous events. • Increasing trends continue to be observed at three of the four wells for salts (bromide, chloride, calcium, sodium, TDS) and dissolved oxygen. • Notable detections in groundwater include NDMA at 18 nanograms per liter (ng/L) at well MW4 and MW1 in March and September, respectively. Perfluoro-octanoic acid (PFOA) was detected in well MW3 at 5.3 ng/L in September.
	SBWR	• The basic chemical composition for various wells indicates a shift towards more saline water, primarily due to increasing chloride at the Curtner, Kelley Park, Columbus Park, Watson Park and Evergreen Park wells. • Increasing trends continue to be observed for salts (including chloride, boron, sodium, sulfate) at the majority of GMMP wells.
Llagas Subbasin	Christmas Hill Park	• Groundwater quality at wells 11S03E12A002 and 110S03E12A003 have similar molar ratios as recycled water and show a slight ionic shift towards recycled water. • Groundwater quality at well 11S03E01Q002 is influenced by adjacent Uvas Creek. • TDS and chloride trends are increasing at well 11S03E12A003. • Notable detections include PFOA (all wells) and nitrosodi-n-butylamine (NDBA) at one well.
	Irrigated Land Near SCRWA	• Groundwater quality at wells 11S04E15M002 and 110S04E16F001 indicate similar molar ratios as recycled water. • The basic chemical composition for all wells (except deep well 11S04E16G003) indicates a shift towards recycled water, in particular for chloride, sodium and potassium. • Increasing trends are observed for TDS and sulfate in well 11S04E16F001, and for chloride and sodium in well 11S04E15M002. • Salt concentrations in most wells were considerably higher than regional shallow groundwater for chloride, sodium, boron, sulfate and TDS. • Notable detections include perfluorochemicals at several wells and NDBA at one well.

The District will continue to monitor groundwater quality near recycled water irrigation sites to evaluate changes in water quality, and will continue to work with stakeholders to identify ways to reduce contaminant loading.

5.6 Salt and Nutrient Management Plans

The State Water Resources Control Board Recycled Water Policy requires the development of regional Salt and Nutrient Management Plans (SNMPs). The purpose of the SNMPs is to address regional salt and nutrient loading to groundwater from all sources, including recycled water and agricultural activity. The District is working with local stakeholders and regulators to develop SNMPs for the Santa Clara and Llagas Subbasins. The plans are expected to be completed in 2014 and will include: salt and nutrient source identification, loading and assimilative capacity estimates, water recycling and storm water recharge goals and objectives, implementation measures, groundwater monitoring provisions, and an anti-degradation analysis.

5.7 Contaminant Release Sites

There are over 400 open cases where non-fuel contaminants have been released to soil and/or groundwater in the county. There are also over 220 open fuel leak sites and 25 Superfund sites. Although there have been very limited impacts to principal drinking water aquifers from these sites, they pose a potential threat to groundwater quality.

Due to the large number of contaminated sites, District staff prioritizes which cases are closely tracked. Currently, staff monitors progress at 11 sites considered to be of the highest priority based on the vulnerability of groundwater, proximity to water supply wells or surface water, and contaminant concentration.

District staff reviews monitoring and progress reports submitted to regulatory agencies by responsible parties, as well as any regulatory orders or correspondence. Staff attends community meetings for the Olin and Moffett Field cases, and advocates for expedited cleanup of high-threat cases through collaboration with regulatory agencies. The District also provides technical review of other contaminant release sites when requested by regulatory agencies.

Key 2013 activities related to high priority contaminant release cases are as follows:

- Olin Corporation, 425 Tennant Avenue, Morgan Hill
  Perchlorate cleanup activities continued and the off-site extraction system began operating. As of December 2013, almost 1,700 AF of water have been treated and 150 pounds of perchlorate have been removed. Olin completed baseline sampling for the Gradient Driven Remediation (GDR) pilot study and the Water Board approved proceeding with the study. The next step in evaluating the potential for relying on natural downward gradients to remediate perchlorate in deeper aquifer zones is the installation of a new monitoring well and the GDR well. Staff continues to participate in the Perchlorate Community Advisory Group meetings.

- Moffett Field, Middlefield-Ellis-Whisman (MEW), and Edenvale Area
  This area includes four Superfund sites and more than 15 individual contaminant release sites with soil and shallow groundwater contamination by trichloroethene (TCE) and other VOCs. The District also reviewed new EPA vapor intrusion guidelines for consistency in investigations at all sites under EPA jurisdiction (the San Francisco Bay Water Board is under contract with the EPA to provide oversight on many of these sites). District staff continues to participate in related Moffett Field Regional Advisory Board (RAB) and EPA community meetings.

- Fuel Leak Cases
  District staff continues to coordinate with the Santa Clara County Department of Environmental Health (DEH) to provide technical support and review as necessary. The State Water Board's implementation of the Low Threat Closure Policy continues to be a concern in some cases. The District submitted comment letters opposing the proposed closure of several sites, including the Nguyen Property (1970 King Rd, San Jose) and Sabek Gas Station (16270 Monterey Rd, Morgan Hill). The State Water Board closed the Nguyen Property site over the objections of the District and DEH, and the decision on the Sabek site has not been announced.

- UTC
  There were no detections of perchlorate or 1-4 dioxane in the creek draining to Anderson Reservoir in 2013. The onsite perchlorate and VOC groundwater plumes appeared to be stable and were consistent with previous sampling data. The Central Groundwater Treatment System extraction wells continue to prevent the migration of contaminated groundwater. Between May 2013 and April 2014, the treatment system removed 21 pounds of VOCs, 125 pounds of perchlorate, and 0.6 pounds 1,4-dioxane. Monitoring results from wells installed within and immediately downgradient of the two in-situ bioremediation trenches indicate that the trenches are performing as designed. Continued monitoring will determine whether the trenches can reduce perchlorate further downgradient.

The evaluation of 2013 groundwater quality data against GWMP outcome measures is summarized below. Additional discussion of outcome measures, including planned action to address measures not being met, is presented in Section 7.

Groundwater Quality Outcome Measures

OM 2.1.1.e.
At least 95% of countywide water supply wells meet primary drinking water standards.

OM 2.1.1.f.
At least 90% of South County wells meet Basin Plan agricultural objectives.

OM 2.1.1.g.
At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids.

OM 2.1.1.e. is not met as only 79% of countywide water supply wells met all primary drinking water standards in 2013. Nitrate remains an ongoing groundwater protection challenge as 30% of water supply wells tested in South County exceeded the primary MCL. Nearly all of these elevated levels occurred in domestic wells. If nitrate were excluded, the outcome measure would have been met since 99% of wells met all other primary drinking water standards. Only three water supply wells, all in North County, had detections above drinking water standards for parameters other than nitrate in 2013. Two wells had elevated aluminum and one well had 1,1-dichlorothene above the MCL.

OM 2.1.1.f. is met as 99% of all South County wells met Basin Plan agricultural objectives in 2013.

OM 2.1.1.g. is partially met. With regard to chloride, 89% of countywide wells in both the shallow and principal aquifer zones had stable or decreasing concentrations. The measure is met for nitrate and total dissolved solids, for which 93% and 94% of wells had stable or decreasing concentrations, respectively.

6. OTHER GROUNDWATER MANAGEMENT ACTIVITIES

Other District groundwater management activities in 2013 included permitting and inspection of over 1,300 wells, reviewing relevant policy and land use proposals, and conducting public outreach on groundwater.

Well Ordinance Program

The District's well ordinance program helps ensure that wells and other deep excavations are properly constructed, maintained, and destroyed so they prevent vertical transport of contaminants into deep drinking water aquifers. The District issued over 1,300 well permits in 2013, primarily for well destruction and monitoring well construction The District also inspected over 1,300 wells to ensure they were properly constructed and destroyed (Table 15).

Table 15 2013 District Well Permit and Inspection Summary

Permit Type	**Number Processed**
Well Construction - Water Producing Wells	72
Well Construction - Monitoring Wells	506
Well Destruction	661
Exploratory Boring	158
Total	**1,397**
Inspection Type	**Number Inspected**
Well Construction - Water Producing Wells	67
Well Construction - Monitoring Wells	531
Well Destruction	631
Exploratory Boring	131
Total	**1,360**

Policy and Legislation Review

The District reviews proposed legislation and policies (both statewide and local) to ensure the county's water resources and the District's ability to manage them are protected. The District reviewed several groundwater-related bills in 2013, although none had a major impact on groundwater resources in Santa Clara County.

In October 2013, the State Water Resources Control Board released a draft concept paper for a proposed groundwater management framework and related Water Board actions. Due to the potential for significant changes in Water Board involvement and oversight, this draft concept paper was released for stakeholder review. The District provided extensive comments highlighting the successful conjunctive water management approach in Santa Clara County and stressing the need for local management of groundwater, rather than a "one size fits all approach." Many other agencies and individuals provided comments, and the Water Board held a series of related workshops in conjunction with other state agencies beginning in January of 2014. The issue of groundwater management at the statewide level has now become the focus of legislation, which the District tracked closely and formally supported.

Land Use Review

Threats to groundwater quality include urban runoff, industrial chemical releases, inefficient agricultural practices, and leaking underground storage tanks. Of particular concern are potentially contaminating activities over groundwater recharge areas, which are more vulnerable to contamination due to more permeable soils and higher groundwater flow rates. Land use decisions fall under the authority of the local cities and the County of Santa Clara. The District reviews land use and development plans related to District facilities and watercourses under District jurisdiction, and provides technical review for other land use proposals as requested by the local agency.

In 2013, the District provided groundwater-related comments on several land use proposals, including the City of Gilroy General Plan Update and the City of Morgan Hill's Citywide Agriculture Preservation Program and Southeast Quadrant Land Use Plan. For all land use reviews, the District comments focus on specific actions (such as groundwater monitoring or analysis) to ensure groundwater resources are adequately protected.

Public Outreach

Public outreach is an important component of the District's groundwater protection efforts. To help keep the public informed about current groundwater and water supply conditions, the District prepares monthly Water Tracker reports that are posted on the District website[18]. The District also posts monthly groundwater condition reports that contain more detailed information on groundwater pumping, recharge, and water levels.

Because groundwater is far removed from the public's view, it can be a challenge to make the connection that actions occurring on the land surface can impact groundwater quality. In 2013, the District celebrated Groundwater Awareness Week (March 9-15) by adopting a Board resolution commemorating the week, highlighting groundwater on the District website, and posting social media messages. The District also celebrated Protect Your Groundwater Day on September 10th by posting information to the District website.

The District also maintained its status as a Groundwater Guardian Affiliate through the Groundwater Guardian Program sponsored by the Groundwater Foundation, a non-profit organization. Groundwater Guardian is an annually earned designation for communities and affiliates that take voluntary, proactive steps toward groundwater protection. District activities include the school program (which reaches thousands of students each year), implementation of groundwater protection programs, and participation in workshops such as the Small Acreage Stewardship series. At this series, District staff presents targeted information on wells and water quality protection to well owners.

The District mailed the 2013 Groundwater Quality Summary to all well owners in June to provide information on sampling by the District and local water suppliers in 2013 (Appendix A). This summary is similar to water retailer consumer confidence reports, and provides basic groundwater quality information to domestic well owners who do not typically receive water from a water retailer.

[18] www.valleywater.org/WaterTracker.aspx

7. CONCLUSIONS

Groundwater conditions were generally good in 2013. Table 16 shows data for key indicators as compared to last year and the last five year (2008 to 2012). While managed recharge was similar to the previous year, groundwater pumping increased, resulting in a net decrease in groundwater storage of 17,000 AF. Groundwater levels were generally lower than last year and the previous five years due to ongoing dry conditions, but they remained above historical minimums. Groundwater quality conditions were generally similar to the previous year and the last five years, with nitrate remaining the primary groundwater protection challenge, particularly in South County.

Table 16 2013 Groundwater Conditions as Compared to Other Indices

Index[1]	2013	Compared to 2012	Compared to Last 5 Years (2008 - 2012)
Managed Recharge	96,500 AF	Similar	Similar
Groundwater Pumping	153,500 AF	Up 16%	Up 9%
Percent of Total Water Used	41%	Up 3%	Same
Groundwater Levels[2]			
Santa Clara Plain	70.4 feet	Down 15%	Down 9%
Coyote Valley	263 feet	Same	Down 1%
Llagas	214.3 feet	Down 3%	Down 3%
End of Year Groundwater Storage	339,000 AF	Down 5%	--
Land Subsidence[3]	0.003 feet/year	Change from net uplift	--
Groundwater Quality[4]			
Santa Clara Plain - TDS	410	Similar[5]	Similar
Coyote Valley - TDS	330	Decrease	Decrease
Llagas - TDS	360	Similar	Similar
Santa Clara Plain – Nitrate	14	Similar	Similar
Coyote Valley – Nitrate	17.6	Increase	Increase
Llagas - Nitrate	22	Similar	Similar

1) Groundwater levels and quality are shown for three groundwater management areas: the Santa Clara Plain and Coyote Valley (which comprise the Santa Clara Subbasin) and the Llagas Subbasin.
2) Groundwater elevations represent the average of all readings at index wells for the time period noted.
3) The established tolerable rate of 0.01 feet per year was not exceeded, and water levels at all subsidence index wells were above these thresholds throughout 2013, indicating a low risk of permanent subsidence.
4) Values shown represent median groundwater quality in mg/L for all principal aquifer zone wells tested. Nitrate values shown are nitrate (as NO_3).
5) Individual wells sampled for TDS and nitrate vary each year so a numeric comparison of median values is not shown. "Similar" indicates that the regional median values were within 20 mg/L for TDS and 3 mg/L for nitrate.

Outcome Measure Performance and Action Plan

The District's GWMP identifies several outcome measures to assess whether basin management objectives are being accomplished. The measurement of 2013 data against these measures is summarized in Table 17 below, along with recommended actions to address measures not being met.

Table 17 Summary of Outcome Measure Performance and Action Plan

Groundwater Storage	• **OM 2.1.1.a.** Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain. Estimated end of 2013 Storage: 301,800 AF • **OM 2.1.1.b.** Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley. Estimated end of 2013 Storage: 10,300 AF • **OM 2.1.1.c.** Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin. Estimated end of 2013 Storage: 27,100 AF
Groundwater Levels and Subsidence	• **OM 2.1.1.d.** 100% of subsidence index wells with groundwater levels above subsidence thresholds. All ten subsidence index wells had groundwater levels above thresholds in 2013.
Groundwater Quality	• **OM 2.1.1.e.** At least 95% of countywide water supply wells meet primary drinking water standards. Only 79% of countywide water supply wells tested in 2013 met primary drinking water standards due to elevated nitrate in South County (mainly in domestic wells). If nitrate is not included, 99% of water supply wells met primary drinking water standards. • **OM 2.1.1.f.** At least 90% of South County wells meet Basin Plan agricultural objectives. Nearly all wells (99%) met Basin Plan agricultural objectives. **Action Plan for OM 2.1.1.e:** • Implement nitrate treatment system rebate program for domestic wells with elevated nitrate. • Complete Salt and Nutrient Management Plans in coordination with basin stakeholders to address nitrate loading.
Groundwater Quality Trends	• **OM 2.1.1.g.** At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids. This measure is nearly met for chloride, with 89% of wells showing stable or decreasing concentrations. This measure is met for nitrate as 93% of wells had stable or decreasing concentrations. This measure is met for total dissolved solids as 94% of wells had stable or decreasing concentrations. **Action Plan for OM 2.1.1.g:** • Complete Salt and Nutrient Management Plans in coordination with basin stakeholders to address salt loading.

Groundwater Outlook

Groundwater levels and storage will continue to decline as dry conditions persist and little surface water is available for managed recharge. Groundwater storage has been critical in helping to meet the county's water supply needs during the last three years with below-normal rainfall. Although GWMP targets for groundwater storage and land subsidence were met for 2013, the projected end of year storage for 2014 is below the 300,000 AF target and water levels are approaching subsidence thresholds in several index wells. In accordance with the Water Shortage Contingency Plan, the District Board has set a 20% water use reduction target in 2014 to ensure fair groundwater reserves for 2015.

Due to ongoing dry conditions, the District has increased the monitoring frequency for water levels and subsidence. We will continue to actively monitor groundwater levels, land subsidence, and water quality to support operational decisions and ensure groundwater resources are protected. The District will also continue to track proposed legislation, policies, and regulatory standards that may impact groundwater resources or the District's ability to manage them.

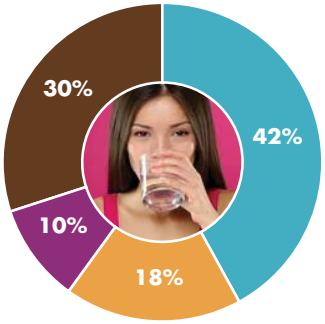
Appendix A – 2013 Groundwater Quality Summary Provided to Well Owners

Santa Clara Valley Water District

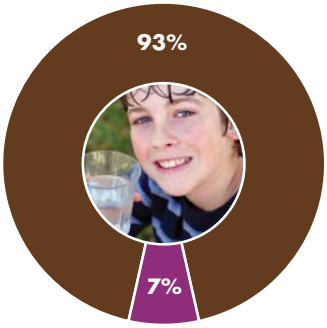
Groundwater Quality Summary Report

For testing performed in 2013

NORTH COUNTY WATER USE



SOUTH COUNTY WATER USE



- Groundwater
- Treated Water
- Hetch-Hetchy
- Other Local and Recycled Water

Safeguarding our groundwater

Groundwater is an essential local resource, providing about half of the water used in Santa Clara County each year. In some areas, groundwater is the only source of drinking water. Protecting our groundwater helps ensure adequate supplies are available now and in the future.

The water district works to safeguard groundwater by:

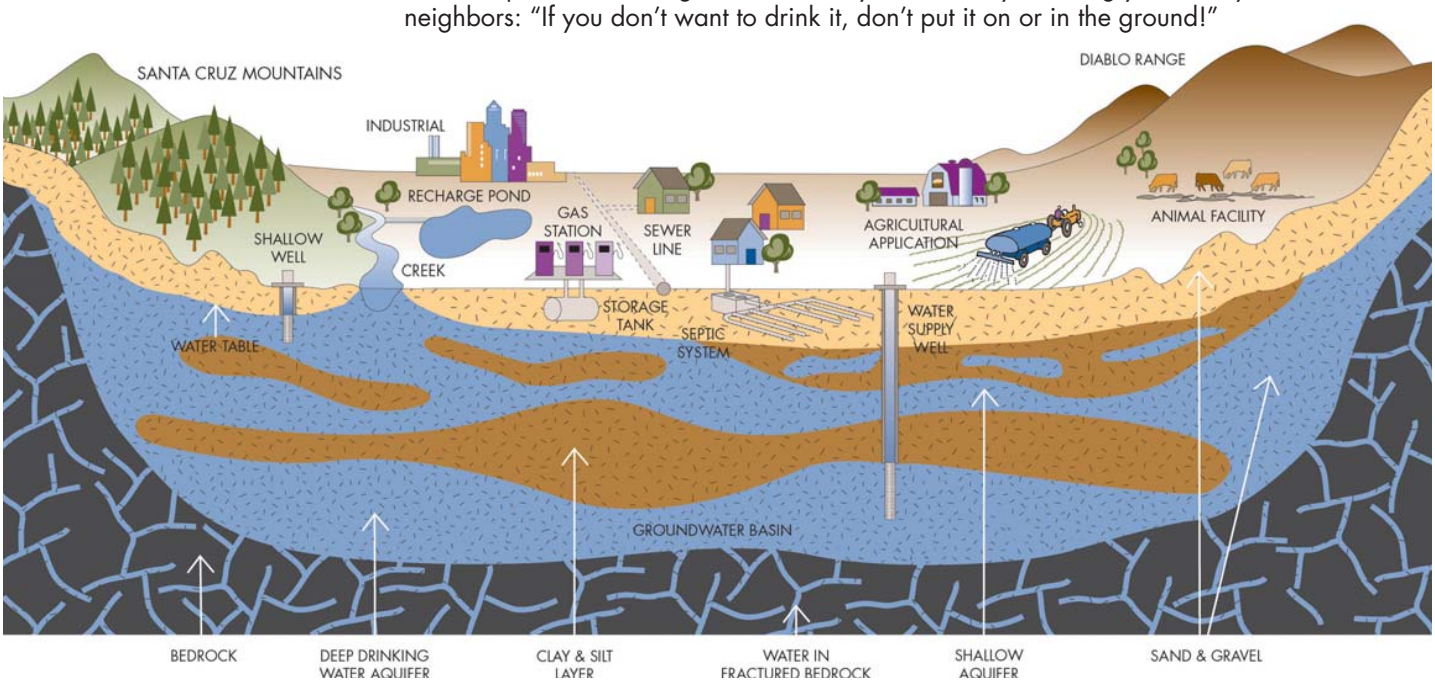
- Replenishing groundwater with local and imported surface water.
- Reducing demands on groundwater through the delivery of treated water and with water conservation and recycling.
- Monitoring groundwater and implementing programs to protect against contamination.

Regular testing of wells throughout the county indicates that groundwater quality is generally very high. Drinking water, including bottled water, may contain at least small amounts of some contaminants. The presence of natural or man-made contaminants does not necessarily indicate that water poses a health risk. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and in some cases, radioactive material, and can pick up substances from animal and human activities.

Contaminants that may be present include:

- Microbial contaminants such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural operations and wildlife.
- Inorganic contaminants such as salts and metals that can be naturally occurring or result from stormwater runoff, industrial or domestic wastewater discharges, animal facilities, mining or farming.
- Pesticides, fertilizers and herbicides that may come from agriculture, stormwater runoff and residential uses.
- Organic chemicals including synthetic and volatile organic chemicals from industrial processes, gas stations, stormwater runoff, agricultural application and septic systems.
- Radioactive contaminants that are typically naturally occurring in our area.

We all have a role in protecting groundwater. Well owners should make sure wells are properly constructed and maintained and should create a zone of protection around the well. See the water district's Guide for the Private Well Owner at **www.valleywater.org** for helpful tips. Residents can help by conserving water and by raising awareness that we live on top of our drinking water. Protect your water by teaching your family, friends, and neighbors: "If you don't want to drink it, don't put it on or in the ground!"



Groundwater monitoring confirms water is of high quality

As part of our comprehensive groundwater management efforts, the water district sampled over 300 domestic water supply wells and evaluated data collected at over 220 wells by local water suppliers. The table below summarizes groundwater quality results for North and South County (see map on back page.) The 2013 results show that nearly all wells tested meet drinking water standards. The primary exception is nitrate, which is an ongoing groundwater protection challenge.

Water from public water systems must meet Maximum Contaminant Levels (MCLs), but domestic systems are not subject to these standards. It should be noted that not every well was tested for all parameters shown, and only parameters that were detected in water supply wells are listed. Water quality standards, including MCLs, are shown to provide context for groundwater quality results. This is a regional summary and may not reflect the water quality in your well since every property and well are unique.

Primary Drinking Water Standards - Public Health Related Standards				North County		South County		
Inorganic Contaminants	UNITS	PRIMARY MCL	PHG	MEDIAN	RANGE	MEDIAN	RANGE	Typical Sources
Aluminum	ppb	1,000	600	ND	ND - 1,300	16.5	ND - 78	Erosion of natural deposits; residue from some surface water treatment processes
Antimony	ppb	6	20	ND	ND	ND	ND - 2	Discharge from industrial processes; fire retardants; ceramics; electronics; solder
Arsenic	ppb	10	0.004	ND	ND - 4.7	1	ND - 4	Erosion of natural deposits; glass and electronics production waste
Asbestos	MFL	7	7	ND	ND	1.4	ND - 5.4	Erosion of natural deposits
Barium	ppb	1,000	2,000	120	ND - 320	102	ND - 200	Erosion of natural deposits
Chromium (total)	ppb	50	-	3.3	ND - 29	2	ND - 6	Erosion of natural deposits; metal plating
Fluoride (natural source)	ppm	2	1	0.15	ND - 0.5	0.13	ND - 0.57	Erosion of natural deposits
Nickel	ppb	100	12	6.9	ND - 43	1.1	ND - 5.33	Erosion of natural deposits; discharge from metal industries
Nitrate (as NO3)	ppm	45	45	17	ND - 83.9	23	ND - 268	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Nitrate + Nitrite (as N)	ppm	10	10	2.3	0.64 - 6	2.9	ND - 4.5	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Perchlorate	ppb	6	6	ND	ND	3.2	ND - 6	Solid rocket propellant, fireworks, explosives, flares, matches, and a variety of industries
Selenium	ppb	50	30	ND	ND - 5.5	ND	ND	Erosion of natural deposits
Radioactive Contaminants								
Gross Alpha	pCi/L	15	-	1.1	ND - 7.5	ND	ND - 3.1	Erosion of natural deposits
Gross Beta	mrem/yr	4	-	ND	ND - 2.3	ND	ND	Erosion of natural deposits
Radium 226 + Radium 228	pCi/L	5	-	1.01	1.01	NA	NA	Erosion of natural deposits
Uranium	pCi/L	20	0.43	ND	ND - 0.62	NA	NA	Erosion of natural deposits
Volatile Organic Chemicals								
1,1,1-Trichloroethane (1,1,1-TCA)	ppb	200	1,000	ND	ND - 4.2	ND	ND	Discharge from metal degreasing sites and other industrial processes
1,1,2-Trichloro-1,2, 2-Trifluoroethane (Freon 113)	ppb	1,200	4,000	ND	ND	ND	ND - 2.18	Discharge from metal degreasing sites and other industrial processes; dry cleaning solvent; refrigerant
1,1-Dichloroethene (1,1-DCE)	ppb	6	10	ND	ND - 6.3	ND	ND	Discharge from industrial processes
Diquat	ppb	20	15	ND	ND - 2.4	ND	ND	Runoff from herbicide use for terrestrial and aquatic weeds
Tetrachloroethene (PCE)	ppb	5	0.06	ND	ND	ND	ND - 2.3	Discharge from industrial processes, dry cleaners, and automotive repair
Microbiological Contaminants[1]				Present	Absent	Present	Absent	Typical Sources
Total Coliform Bacteria				14	15	89	214	Naturally present in the environment
E. Coli Bacteria				1	28	1	302	Human and animal fecal waste

Notes: 1) The table shows the number of domestic wells tested that had bacteria present or absent. Public water systems are required to ensure that fewer than 5% of samples have total coliform present and that no samples have e.coli present. Domestic wells are not subject to these standards.

Terms and Definitions

Color units: A measure of color in water

Maximum Contaminant Level (MCL): The highest level of a contaminant allowed in public water systems. Primary MCLs are set as close to PHGs as is economically and technologically feasible. Secondary MCLs protect the odor,taste, and appearance of drinking water.

Median: The "middle" value of the results, with half of the values above the median value and half of the values below the median value.

MFL: = Million Fibers per Liter

uS/cm: microSiemens per centimeter (a measure of the dissolved inorganic salt content)

mrem/yr: millirem per year (a measure of radiation)

NA: Not analyzed

ND: Not detected (at laboratory testing limit)

NTU: Nephelometric Turbidity Units

pCi/L: picoCuries per liter (a measure of radiation)

ppm: parts per million (milligrams per liter)

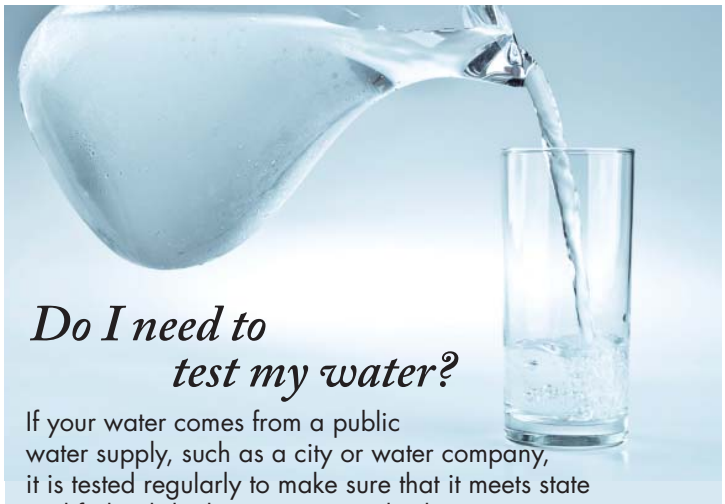
ppb: parts per billion (micrograms per liter)

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to human health. PHGs are set by the California EPA.

TON: Threshold Odor Number

Secondary Drinking Water Standards - Aesthetic Standards	UNITS	SECONDARY MCL	PHG	North County MEDIAN	North County RANGE	South County MEDIAN	South County RANGE	Typical Sources
Chloride	ppm	250	-	45	28 - 140	50.5	23 - 116	Runoff/leaching from natural deposits; seawater influence
Color	color units	15	-	ND	ND - 58	3	ND - 12	Naturally-occurring organic materials
Copper	ppb	1,000	300	25	ND - 360	4.4	ND - 80	Internal corrosion of household plumbing systems; erosion of natural deposits
Iron	ppb	300	-	75.8	ND - 64,000	20.8	ND - 580	Leaching from natural deposits; industrial wastes
Manganese	ppb	50	-	10.4	ND - 570	3	ND - 110	Leaching from natural deposits; industrial wastes
Odor Threshold	TON	3	-	ND	ND - 2	1	ND - 1	Naturally-occurring organic materials
pH	pH units	6.5 - 8.5	-	7.6	6.07 - 8.2	7.6	7.4 - 8.2	Carbon dioxide emissions; rainfall; erosion of natural deposits
Specific Conductance	uS/cm	900	-	685	430 - 3,360	639	343 - 1,600	Substances that form ions when in water; seawater influence
Sulfate	ppm	250	-	43.6	4.5 - 409	36.2	1 - 152	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (TDS)	ppm	500	-	410	290 - 710	360	262 - 684	Runoff/leaching from natural deposits
Turbidity	NTU	5	-	0.3	ND - 12	0.15	ND - 3.9	soil runoff
Zinc	ppb	5,000	-	ND	ND - 150	14	ND - 220	Runoff/leaching from natural deposits; industrial wastes
Other Water Quality Parameters								
Alkalinity (total, as CaCO3)	ppm	-	-	220	22 - 360	167	113 - 363	Atmospheric and vadose zone carbon dioxide
Bicarbonate (as CaCO3)	ppm	-	-	271	250 - 291	168	144 - 363	Atmospheric and vadose zone carbon dioxide
Boron	ppb	-	-	ND	ND - 418	105	ND - 614	Erosion of natural deposits
Bromide	ppm	-	-	0.18	0.06 - 4.12	0.18	ND - 2.12	Seawater intrusion and sea spray
Calcium	ppm	-	-	66.5	42 - 95	46	22.6 - 106	Erosion of natural deposits
Carbon Dioxide	ppm	-	-	7.8	ND - 450	ND	ND	Atmospheric sources; dissolution of carbonate rocks
Chloroform (THM)	ppb	-	-	ND	ND	ND	ND - 15.3	Byproduct of drinking water disinfection
Chromium-6 (Hexavalent)*	ppb	-	0.02	1.01	ND - 1.55	2.6	1.8 - 5.9	Erosion of natural deposits; metal plating and industrial discharges
DCPA (total di & mono acid degradates)	ppb	-	-	ND	ND - 0.1	ND	ND	Runoff from herbicide use for terrestrial weeds
Dichlorodifluoromethane (Freon 12)	ppb	-	-	ND	ND - 5.6	ND	ND	Discharge from industrial factories; degreasing solvent; propellant and refrigerant
Hardness (total, as CaCO3)	ppm	-	-	284	92 - 748	254	ND - 639	Erosion of natural deposits
Lead	ppb	-	0.2	2.1	ND - 17	1.3	ND - 43	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits
Lithium	ppb	-	-	5	ND - 21	8.6	ND - 25	Erosion of natural deposits; discharge from industrial uses
Magnesium	ppm	-	-	27	13 - 67	30.1	13.1 - 51.8	Erosion of natural deposits
Molybdenum	ppb	-	-	ND	ND - 8.1	ND	ND - 3.3	Byproduct of water disinfection
Orthophosphate	ppm	-	-	0.15	ND - 1.09	ND	ND - 0.88	Leaching from natural deposits; agricultural runoff
Potassium	ppm	-	-	1.3	ND - 2.1	1.3	ND - 1.7	Erosion of natural deposits
Radium 226	pCi/L	-	0.05	ND	ND - 0.53	NA	NA	Erosion of natural deposits
Radium 228	pCi/L	-	0.019	ND	ND - 0.48	ND	ND	Erosion of natural deposits
Silica	ppm	-	-	28.3	23.9 - 31.3	27.1	20.2 - 43.1	Erosion of natural deposits
Sodium	ppm	-	-	30.5	17 - 95	28	14.2 - 390	"Sodium" refers to the salt present in the water and is generally naturally-occurring
Total Organic Carbon (TOC)	ppm	-	-	0.42	0.41 - 0.43	NA	NA	Various natural and manmade sources
Vanadium	ppb	-	-	ND	ND	ND	ND - 11	Erosion of natural deposits; discharge from industrial uses

*Beginning on July 1, 2014 the California primary MCL for Chromium 6 will be 10 ppb.



Do I need to test my water?

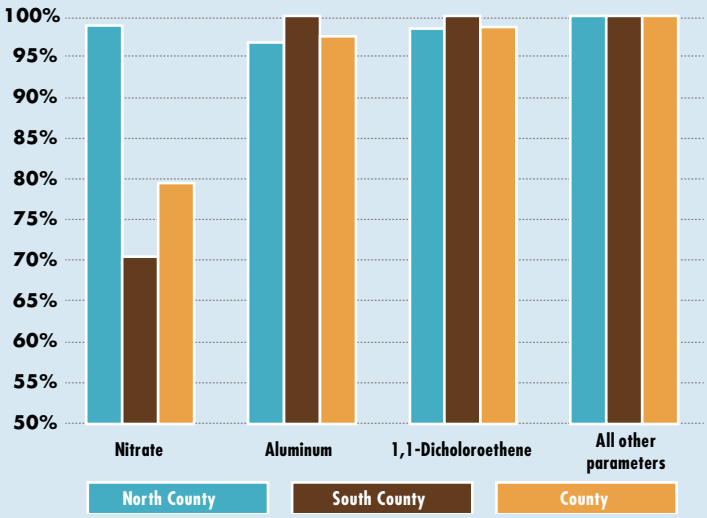
If your water comes from a public water supply, such as a city or water company, it is tested regularly to make sure that it meets state and federal drinking water standards.

If your water comes from a private well, you are responsible for making sure it is safe to drink. Although the water district monitors regional groundwater quality, every property and well has unique conditions. Some contaminants are colorless and odorless, so the surest way to protect your health is to have your water tested.

The water district encourages private well owners to have their well water tested by a state-certified laboratory annually or more often if there is a change in taste, odor or appearance. If your water contains any contaminant above drinking water standards, you may want to install a treatment system or use an alternative source of water.

The water district is currently offering free basic water quality testing for eligible domestic wells and rebates for nitrate treatment systems — call the Groundwater Hotline at **(408) 630-2300** to find out more.

PERCENTAGE OF WATER SUPPLY WELLS TESTED IN 2013 MEETING PRIMARY DRINKING WATER STANDARDS



Current Water Quality Issues

Nitrate

Common sources of nitrate are fertilizers, septic systems and livestock waste, so nitrate is often higher in rural and agricultural areas. As shown in the chart to the left, nitrate is an ongoing groundwater protection challenge, particularly in South County.

Nitrate can interfere with the blood's ability to transport oxygen and is of greatest concern for infants and pregnant women. The effects of consuming high levels of nitrate are often referred to as "blue baby syndrome" and symptoms include shortness of breath and blueness of the skin.

The water district monitors nitrate to assess hot spots and trends, recharges groundwater to dilute nitrate, and works with other agencies to address elevated nitrate in groundwater. The water district is offering rebates to domestic well users that purchase and install nitrate treatment systems. Call the Groundwater Hotline at (408) 630-2300 for more information.

Aluminum

Some people who drink water containing excess aluminum over many years may experience short-term gastrointestinal effects. Aluminum is typically naturally occurring.

1,1-Dichloroethene

1,1-Dichloroethene (1,1-DCE) is used in making adhesives, synthetic fibers, refrigerants and food packaging and coating resins. Some people who drink water with excess 1,1-DCE over many years may have increased liver or kidney damage and increased risk of cancer.

Perchlorate

Perchlorate is a salt used for rocket fuel, highway flares, fireworks and other uses. Perchlorate can have adverse health effects at high levels as it can interfere with the thyroid gland, which can affect hormones that regulate metabolism and growth.

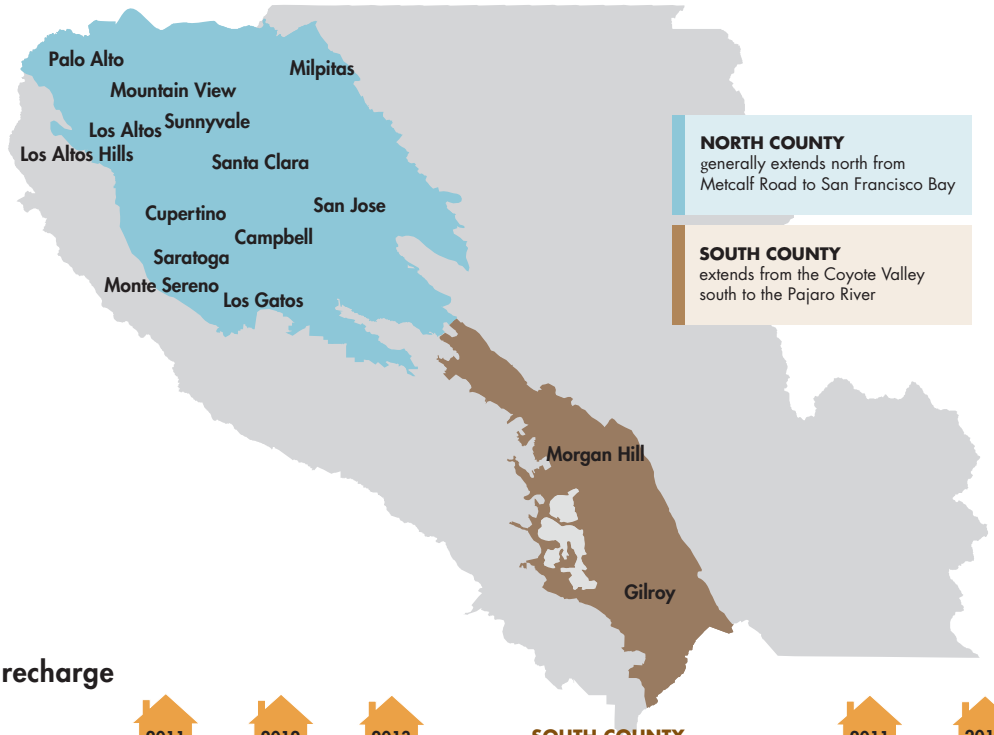
Contamination from a former highway flare manufacturer in Morgan Hill was first discovered in 2000. At the urging of the water district and the community, the Central Coast Regional Water Quality Board has taken timely action to restore groundwater quality.

Due to cleanup activities and groundwater recharge, perchlorate levels have decreased significantly. The plume is also getting smaller, now approximately extending from Tennant Avenue south to the San Martin Airport area. A few water supply wells still contain perchlorate above the drinking water standard and remediation by the responsible party is ongoing.

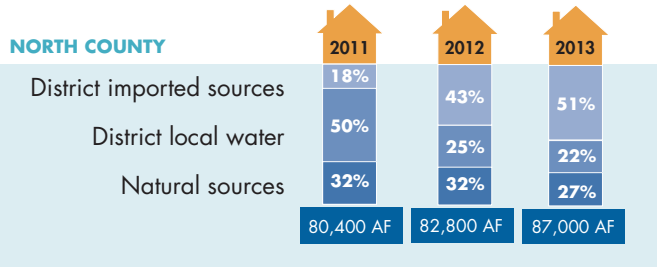
Chromium-6

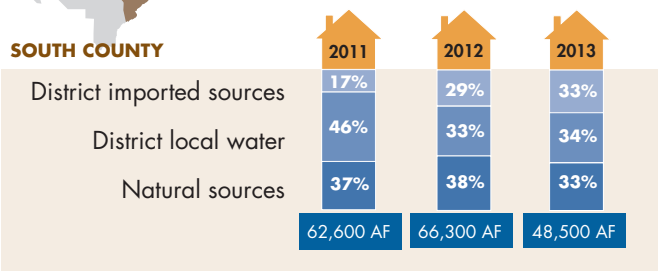
Chromium-6, a suspected carcinogen, is a naturally occurring metal that is also used in several industrial processes. California's drinking water standard of 10 parts per billion (ppb) for Chromium-6 becomes effective on July 1, 2014.

You live on a groundwater basin



Groundwater recharge





AF: an acre foot of water is used by two families of five in one year.
Graphic representation, not to scale.

Health and education information

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the United States Environmental Protection Agency's Safe Drinking Water Hotline at **1-800-426-4791**. You can obtain additional health information on the California Department of Public Health website at **www.cdph.ca.gov** or by consulting your healthcare provider.

ACCESS VALLEY WATER

For more information, visit our website at **valleywater.org** and use our Access Valley Water customer request and information system. With three easy steps, you can use this service to submit questions, complaints or compliments directly to a water district staff person.

If you have questions or concerns about this report, please contact the water district's Groundwater Hotline at: **(408) 630-2300**.

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Appendix B – 2013 Groundwater Quality Results by Subbasin and Zone

Table B-1 Summary of 2013 Water Quality Indicator Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Aggressive Index (Corrosivity)	INDEX	1	12	12	12	55	9.7	12	13	2	12	12.5	13	--	--	--	--	11	10	10	13	--	--
Alkalinity (Total as CaCO3)	mg/L	14	170	274	552	66	22	220	363	13	162	180	348	18	109	194.5	351	27	113	186	363	--	--
Alkalinity- Bicarbonate (as CaCO3)	mg/L	13	170	298	552	8	147	287	363	9	162	187	348	18	109	194.5	351	16	144	205.5	363	--	--
Alkalinity- Carbonate (as CaCO3)	mg/L	13	<5	<5	<5	8	<5	<5	<5	9	<5	<5	<5	18	<5	<5	<5	16	<5	<5	<5	--	--
Alkalinity- Hydroxide (as CaCO3)	mg/L	13	<5	<5	<5	8	<5	<5	<5	9	<5	<5	<5	18	<5	<5	<5	16	<5	<5	<5	--	--
Caffeine	ug/L	2	<0.05	<0.05	<0.05	41	<0.5	<0.5	<0.5	2	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--
Carbonate Alkalinity	mg/L	14	<2	<5	<5	60	<2	<5	<5	12	<2	<5	<5	18	<5	<5	<5	25	<5	<5	<10	--	--
Color	UNITS	1	<3	<3	<3	52	<2.5	3.3	58	5	<3	<3	5	--	--	--	--	9	<3	3	12	--	15
E Coli	P/A 100ml	5	All absent			--	--	--	--	38	37 absent	1 present	--	17	All absent			23	All absent			--[9]	--
Foaming Agents (MBAS)	ug/L	1	<0.05	<0.05	<0.05	52	<0.05	<0.05	<0.05	3	<0.05	<0.05	<0.05	--	--	--	--	9	<0.05	<0.05	<0.05	--	500
Hardness (Total) as CaCO3	mg/L	6	236	250	535	58	160	290	432	42	113	250.5	417	15	97	247	401	34	172	249	474	--	--
Hydroxide Alkalinity	mg/L	14	<2	<5	<5	60	<1	<2	<5	12	<2	<5	<5	18	<5	<5	<5	25	<5	<5	<5	--	--
Langelier Index @ 60 C	INDEX	1	0.89	0.89	0.89	32	0.069	0.91	1.3	2	0.62	0.67	0.72	--	--	--	--	11	0.15	0.41	0.71	--	--
Langelier Index At Source Temp	INDEX	--	--	--	--	21	-2.39	-0.44	0.43	--	--	--	--	--	--	--	--	9	-0.45	-0.19	-0.08	--	--
Odor Threshold @ 60 C	TON	1	2	2	2	54	<1	<1	2	5	<1	<1	1	--	--	--	--	11	<1	1	1	--	3
Oxidation Reduction Potential	mV	9	-44	139	178	6	-63	120.5	191	3	93	104	154	11	106	133	164	16	-10	129.5	176	--	--
pH[10]	pH units	14	6.86	7.16	7.7	131	6.07	7.4	8.21	13	7.04	7.38	8	17	6.55	6.96	7.46	27	6.8	7.39	8.2	6.5 - 8.5	--
Source Temperature C	C	13	16	19.5	20.9	13	18	19	27.2	9	16.6	19.3	20.1	17	16.7	18.7	20.2	16	16.8	19.2	22.6	--	--
Specific Conductance[10]	uS/cm	16	522	836.5	4460	77	413	660	1200	48	390	614	1070	29	309	624	1390	98	327	576	1170	--	900 (1600)
Total Coliform	P/A 100ml	5	1 absent	4 present	--	--	--	--	--	38	26 absent	12 present	--	17	14 absent	3 present	--	23	14 absent	9 present	--	--[9]	--
Turbidity[10]	NTU	14	0	0.49	6.5	67	<0.1	0.32	12	13	0.15	0.8	7.15	17	0	0.87	31.6	26	<0.05	0.69	4.1	--	5

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. mg/L = milligrams per liter; uS/cm = microSiemens per centimeter; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2013 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.
9. A public water system collecting fewer than 40 samples per month is in violation of the total coliform MCL if more than one sample is total coliform positive or if there is a repeat positive for fecal coliform or E. coli. All wells sampled in 2013 were private domestic wells.
10. Summary statistics computed from combined laboratory and field measured data.

Table B-2 Summary of 2013 Inorganic Constituent Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Major and Minor Ions																							
Bicarbonate (as HCO3)	mg/L	14	207	335	672	66	110	275	443	13	198	220	425	18	133	238	428	27	128	227	442	--	--
Bromide	mg/L	15	0.06	0.19	4.18	11	<0.05	0.11	0.23	44	<0.05	0.11	0.92	28	<0.05	0.1	0.37	38	<0.1	0.15	0.57	--	--
Calcium	mg/L	14	28	70	253	67	15	66	95	13	7.1	41.7	76	18	24.8	54.8	92.2	27	29	46	106	--	--
Calcium (as CaCO3)	mg/L	13	70.1	176	633	8	37.5	135	221	9	17.8	105	150	18	61.9	137	230	16	72.5	132	265	--	--
Carbon Dioxide	mg/L	1	<2	<2	<2	47	<2	9	450	1	<2	<2	<2	--	--	--	--	--	--	--	--	--	--
Chloride	mg/L	14	27	58	1280	66	13	45	140	13	13	40	121	18	11	46	190	27	17	50	116	--	250 (500)
Cyanide	ug/L	1	<100	<100	<100	62	<5	<100	<100	5	<100	<100	<100	--	--	--	--	13	<5	<5	<100	150	--
Fluoride (Natural Source)	mg/L	16	<0.05	0.17	0.34	77	<0.1	0.15	0.3	47	<0.05	0.14	0.57	28	0.08	0.14	0.26	42	<0.1	0.13	0.36	2	
Magnesium	mg/L	14	21.3	42.2	211	67	6.9	25	67	13	13.1	31.2	60.7	18	13.1	36.3	63.6	27	10.5	27	58.3	--	--
Perchlorate	ug/L	14	<4	<4	<4	72	<4	<4	<4	15	<4	<4	<4	18	<4	<4	<4	80	<4	<4	6	6	--
Potassium	mg/L	14	<0.5	1.3	2.3	59	<1	1.3	3.3	10	0.6	1	1.5	18	<0.5	0.9	1.5	25	<0.5	1.4	1.7	--	--
Silica	mg/L	13	20.1	25.4	34.2	11	18.4	28.3	31.3	9	20.2	25.6	39.6	18	20.9	30.2	42.5	16	21.6	28	43.1	--	--
Sodium	mg/L	14	20.9	40.9	354	67	17	31	107	13	19	26	111	18	12.6	24.9	105	27	15.6	29	390	--	--
Sodium Adsorption Ratio (adj)	--	14	0.68	0.13	4.67	59	0.57	0.94	6.09	13	0.58	0.81	3.28	17	0.39	0.73	2.61	27	0.48	0.95	10.78	--	--
Sulfate	mg/L	16	14.7	56.8	201	66	1	44	78.7	48	1.5	42	85.2	28	10	34.7	110	40	3.3	36.6	81.9	--	250 (500)
Total Filterable Residue 180 C (TDS)	mg/L	14	300	491	2,710	66	244	410	710	19	262	330	590	18	204	409	824	27	292	360	684	--	500 (1,000)
Nutrients																							
Nitrate (as NO3)	mg/L	16	<0.05	4.8	42.9	229	<0.05	14	42.3	76	<0.05	17.6	161	28	<0.05	30.7	154	128	<0.05	22	132.28	45	
Nitrate + Nitrite (as N)	ug/L	1	1,800	1,800	1,800	52	640	2,000	6,000	3	<400	<400	700	--	--	--	--	9	1,500	3,100	4,500	10	
Nitrite (as N)	ug/L	1	<400	<400	<400	73	<50	<400	<400	14	<400	<400	<400	--	--	--	--	25	<100	<400	<400	1,000	
Phosphate- Ortho	mg/L	15	<0.05	0.16	0.53	11	<0.05	0.1	1.71	44	<0.05	<0.05	0.38	28	<0.05	<0.5	0.16	29	<0.05	0.05	0.88	--	
Trace Elements																							
Aluminum	ug/L	14	<20	47.4	140	81	<20	21	1300	14	<20	32.6	78	18	<20	32.4	150	29	<10	17.3	46	1,000	200
Antimony	ug/L	14	<1	<1	<6	75	<1	<6	<6	12	<1	<1	<6	18	<1	<1	<1	29	<1	<1	2	6	--
Arsenic	ug/L	14	<1	1.9	11	75	<1	2.5	4.7	12	<1	3	4	18	<1	<1	1.06	29	<1	1	4	10	--
Asbestos	MFL	--	--	--	--	3	<0.2	<0.2	<0.2	2	<0.2	<0.2	<0.2	--	--	--	--	8	<0.2	1.8	5.4	7	--
Barium	ug/L	14	40	120	800	75	<100	110	320	12	72	105	260	18	11	110	340	29	16	117	470	1,000	--
Beryllium	ug/L	14	<1	<1	<1	75	<1	<1	<1	12	<1	<1	<1	18	<1	<1	<1	29	<1	<1	<1	4	--
Boron	ug/L	13	102	182	585	11	<100	155	418	9	55.4	123	614	18	<50	124.5	352	16	<50	103.5	201	--	--
Cadmium	ug/L	14	<0.2	<0.2	<1	75	<0.2	<1	<1	12	<0.2	<0.2	<1	18	<0.2	<0.2	<0.2	29	<0.2	<0.2	<1	5	--
Chromium (Total)	ug/L	14	<1	1.9	4.2	78	<1	2.5	29	12	<1	2.1	4.7	18	<1	2	6.3	29	<1	2	6	50	--
Chromium- 6 (Hexavalent)	ug/L	--	--	--	--	--	--	--	--	3	1.8	2.6	5.9	--	--	--	--	--	--	--	--	--	--
Cobalt	ug/L	13	<1	<1	<1	11	<1	<1	<1	9	<1	<1	<1	18	<1	<1	1.5	16	<1	<1	<1	--	--
Copper	ug/L	14	<0.5	1.6	4.8	73	<0.5	5.7	360	13	0.64	1.1	2.9	18	1	2.1	12	27	1.2	3.9	80	--	1,000
Iron	ug/L	14	<20	64	690	106	<20	69.4	64,000	15	<20	<20	88.2	18	<20	<20	240	29	<10	26.1	580	--	300
Lead	ug/L	14	<0.5	<0.5	<5	71	<0.5	1.2	17	10	<0.5	<0.5	<5	18	<0.5	<0.5	2.36	29	<0.5	0.8	43	--	--
Lithium	ug/L	13	<5	7	17	11	<5	5.1	21	9	<5	9.1	13	18	<5	7.1	30	16	<5	8.6	25	--	--
Manganese	ug/L	14	<1	80.5	1,760	75	1.4	11.4	570	15	<1	15	339	18	<1	1.8	185	27	<1	5.6	110	--	50
Mercury	ug/L	1	<1	<1	<1	67	<0.2	<1	<1	3	<1	<1	<1	1	<1	<1	<1	13	<0.5	<0.5	<1	2	--
Molybdenum	ug/L	13	<1	1	32	11	<1	2	8.7	9	<1	<1	7.7	18	<1	<1	1	16	<1	<1	7.4	--	--
Nickel	ug/L	14	<1	2	3.798	75	<1	2.3	43	12	<1	1	2.924	18	<1	1.9	11.7	29	<1	1	5.33	100	--
Selenium	ug/L	14	<5	<5	<5	75	<2	<5	5.5	12	<5	<5	<5	18	<5	<5	8	29	<2	<5	<5	50	--
Silver	ug/L	14	<1	<1	<10	67	<1	<10	<10	13	<1	<1	<10	18	<1	<1	<1	27	<1	<1	<10	--	100
Thallium	ug/L	14	<1	<1	<1	75	<1	<1	<1	12	<1	<1	<1	18	<1	<1	<1	29	<1	<1	<1	2	--
Vanadium	ug/L	13	<3	<3	3.5	11	<3	<3	4.1	9	<3	<3	9.2	18	<3	<3	14	16	<3	<3	11	--	--
Zinc	ug/L	14	<10	<10	24.87	67	<10	<50	170	13	<10	<10	<50	18	<10	<10	49.3	27	<10	15.6	220	--	5,000

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. mg/L = milligrams per liter; ug/L = micrograms per liter; MFL = million fibers per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2013 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.

Table B-3 Summary of 2013 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL
1,1,1,2-Tetrachlorethane	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,1,1-Trichloroethane	ug/L	13	D	<0.5	119	D	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	200	--
1,1,2,2-Tetrachloroethane	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	1	--
1,1,2-Trichloro,1,2,2,Trifluoroethane (Freon 113)	ug/L	13	D	<10	119	D	<10	12	ND	<10	17	ND	<2	54	D	<10	1,200	--
1,1,2-Trichloroethane	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
1,1-Dichloroethane	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
1,1-Dichloroethylene	ug/L	13	ND	<0.5	119	D	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	6	--
1,1-Dichloropropene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,2,3-Trichlorobenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,2,3-Trichloropropane	ug/L	12	ND	<0.5	33	ND	<0.5	9	ND	<0.5	17	ND	<0.5	16	ND	<0.5	--	--
1,2,4-Trichlorobenzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
1,2,4-Trimethylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,2-Dichlorobenzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	600	--
1,2-Dichloroethane	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	0.5	--
1,2-Dichloropropane	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
1,3,5-Trimethylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,3-Dichlorobenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,3-Dichloropropane	ug/L	13	ND	<0.5	56	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
1,3-Dichloropropene (Total)	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	0.5	--
1,4-Dichlorobenzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
1-Phenylpropane (N,Propylbenzene)	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
2,2-Dichloropropane	ug/L	13	ND	<0.5	39	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
2,4-Dinitrotoluene	ug/L	2	ND	<0.1	41	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
2-Chlorotoluene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
4-Chlorotoluene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Benzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	1	--
Benzo (A) Pyrene	ug/L	2	ND	<0.1	56	ND	<0.1	2	ND	<0.1	0	NA	--	18	ND	<0.1	0.2	--
Bromobenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Bromochloroacetic Acid (BCAA)	ug/L	0	NA	--	2	ND	<1	0	NA	--	0	NA	--	0	NA	--	--	--
Bromochloromethane	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Bromodichloromethane (THM)	ug/L	13	ND	<1	50	D	<1	12	ND	<1	17	ND	<0.5	56	ND	<1	--	--
Bromoform (THM)	ug/L	13	ND	<1	50	D	<1	12	ND	<1	17	ND	<0.5	56	ND	<1	--	--
Bromomethane	ug/L	13	ND	<0.5	38	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Carbon Disulfide	ug/L	1	ND	<0.5	27	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	--	--
Carbon Tetrachloride	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	0.5	--
Chloroethane	ug/L	13	ND	<0.5	39	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Chloroform (THM)	ug/L	13	ND	<1	50	D	<1	12	ND	<1	17	D	<0.5	56	ND	<1	--	--
Chloromethane	ug/L	13	ND	<0.5	39	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Cis-1,2-Dichloroethylene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	6	--
Di(2-Ethylhexyl)Adipate	ug/L	2	ND	<5	56	ND	<5	2	ND	<5	0	NA	--	18	ND	<5	400	--
Di(2-Ethylhexyl)Phthalate	ug/L	2	ND	<3	56	ND	<3	2	ND	<3	0	NA	--	18	ND	<3	4	--
Dibromoacetic Acid (DBAA)	ug/L	0	NA	--	2	ND	<1	0	NA	--	0	NA	--	2	ND	<1	--	--
Dibromochloromethane (THM)	ug/L	13	ND	<1	50	D	<1	12	ND	<1	17	ND	<0.5	56	ND	<1	--	--
Dibromochloropropane (DBCP)	ug/L	2	ND	<0.01	54	ND	<0.01	2	ND	<0.01	0	NA	--	18	ND	<0.01	0.2	--
Dibromomethane	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Dichloroacetic Acid (DCAA)	ug/L	0	NA	--	2	ND	<1	0	NA	--	0	NA	--	2	ND	<1	--	--
Dichlorodifluoromethane (Freon 12)	ug/L	13	ND	<0.5	49	D	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Dichloromethane (Methylene Chloride)	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
Diisopropyl Ether	ug/L	13	ND	<3	39	ND	<3	12	ND	<3	17	ND	<2	54	ND	<3	--	--
Ethylbenzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	300	--
Ethylene Dibromide (EDB)	ug/L	2	ND	<0.02	54	ND	<0.02	2	ND	<0.02	0	NA	--	18	ND	<0.02	0.05	--
Ethyl-Tert-Butyl Ether	ug/L	13	ND	<3	39	ND	<3	12	ND	<3	17	ND	<2	54	ND	<3	--	--
HAA5 - Haloacetic Acids (HAA5)	ug/L	0	NA	--	2	ND	<2	0	NA	--	0	NA	--	0	NA	--	60	--
Hexachlorobutadiene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Isopropylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Methyl Ethyl Ketone (MEK- Butanone)	ug/L	1	ND	<5	38	ND	<5	3	ND	<5	0	NA	--	38	ND	<5	--	--

Table B-3 Summary of 2013 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL
Methyl Isobutyl Ketone	ug/L	1	ND	<5	39	ND	<5	3	ND	<5	0	NA	--	38	ND	<5	--	--
Methyl-Tert-Butyl-Ether (MTBE)	ug/L	13	ND	<3	121	ND	<3	12	ND	<3	17	ND	<2	54	ND	<3	13	5
Monobromoacetic Acid (MBAA)	ug/L	0	NA	--	2	ND	<1	0	NA	--	0	NA	--	2	ND	<1	--	--
Monochloroacetic Acid (MCAA)	ug/L	0	NA	--	2	ND	<2	0	NA	--	0	NA	--	2	ND	<2	--	--
Monochlorobenzene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	70	--
M,P-Xylene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Naphthalene	ug/L	14	ND	<0.5	64	ND	<0.5	12	ND	<0.5	18	ND	<0.5	54	ND	<0.5	--	--
N-Butylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
N-Nitrosodiethylamine(NDEA)	ng/L	0	NA	--	0	NA	--	0	NA	--	1	ND	<2	0	NA	--	--	--
N-Nitrosodimethylamine (NDMA)	ng/L	0	NA	--	0	NA	--	0	NA	--	2	ND	<2	0	NA	--	--	--
N-Nitrosodi-N-Butylamine(NDBA)	ng/L	0	NA	--	0	NA	--	0	NA	--	1	ND	<2	0	NA	--	--	--
N-Nitrosodi-N-Propylamine (NDPA)	ng/L	0	NA	--	0	NA	--	0	NA	--	1	ND	<2	0	NA	--	--	--
N-Nitrosomethylethylamine (NMEA)	ng/L	0	NA	--	0	NA	--	0	NA	--	1	ND	<2	0	NA	--	--	--
N-Nitrosopyrrolidine(NPYR)	ng/L	0	NA	--	0	NA	--	0	NA	--	1	ND	<2	0	NA	--	--	--
O-Xylene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
PCB-1016	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1221	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1232	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1242	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1248	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1254	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	0.5	--
PCB-1260	ug/L	2	ND	<0.5	50	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	--	--
P-Isopropyltoluene	ug/L	13	ND	<0.5	38	ND	<0.5	11	ND	<0.5	17	ND	<0.5	16	ND	<0.5	--	--
Polychlorinated Biphenyls (Total PCBs)	ug/L	2	ND	<0.5	54	ND	<0.5	2	ND	<0.5	0	NA	--	18	ND	<0.5	0.5	--
Sec-Butylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Styrene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	100	--
Tert-Amyl-Methyl Ether	ug/L	13	ND	<3	39	ND	<3	12	ND	<3	17	ND	<2	54	ND	<3	--	--
Tert-Butyl Alcohol	ug/L	12	ND	<2	12	ND	<2	10	ND	<2	17	ND	<2	54	ND	<2	--	--
Tert-Butylbenzene	ug/L	13	ND	<0.5	50	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--
Tetrachloroethylene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	D	<0.5	5	--
Toluene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	150	--
Total Trihalomethanes	ug/L	1	ND	<0.5	27	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	80	--
Trans-1,2-Dichloroethylene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	10	--
Trichloroacetic Acid (TCAA)	ug/L	0	NA	--	2	ND	<1	0	NA	--	0	NA	--	2	ND	<1	--	--
Trichloroethylene	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	5	--
Trichlorofluoromethane (Freon 11)	ug/L	13	ND	<5	119	ND	<5	12	ND	<5	17	ND	<2.5	54	ND	<5	150	--
Vinyl Chloride	ug/L	13	ND	<0.5	119	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	0.5	--
Xylenes (Total)	ug/L	13	ND	<0.5	104	ND	<1	11	ND	<0.5	17	ND	<0.5	16	ND	<0.5	1,750	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table B-4 Summary of 2013 Detected Volatile Organic Compounds (VOCs)

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
1,1,1-Trichloroethane	ug/L	13	<0.5	<0.5	1.7	119	<0.5	<0.5	4.2	12	<0.5	<0.5	<0.5	17	<0.5	<0.5	<0.5	54	<0.5	<0.5	<0.5	200	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	ug/L	13	<2	<2	3.8	119	<0.5	<2	2.88	12	<2	<2	<10	17	<2	<2	<2	54	<2	<2	2.18	1,200	--
1,1-Dichloroethylene	ug/L	13	<0.5	<0.5	<0.5	119	<0.5	<0.5	6.3	12	<0.5	<0.5	<0.5	17	<0.5	<0.5	<0.5	54	<0.5	<0.5	<0.5	6	--
Bromodichloromethane (THM)	ug/L	13	<0.5	<0.5	<1	50	<0.5	<1	2.6	12	<0.5	<0.5	<1	17	<0.5	<0.5	<0.5	56	<0.5	<1	<1	--	--
Bromoform (THM)	ug/L	13	<0.5	<0.5	<1	50	<0.5	<1	10.8	12	<0.5	<0.5	<1	17	<0.5	<0.5	<0.5	56	<0.5	<1	<1	--	--
Chloroform (THM)	ug/L	13	<0.5	<0.5	<1	50	<0.5	<1	1.1	12	<0.5	<0.5	<1	17	<0.5	<0.5	15.3	56	<0.5	<1	<1	--	--
Dibromochloromethane (THM)	ug/L	13	<0.5	<0.5	<1	50	<0.5	<1	6.5	12	<0.5	<0.5	<1	17	<0.5	<0.5	<0.5	56	<0.5	<1	<1	--	--
Dichlorodifluoromethane (Freon 12)	ug/L	13	<0.5	<0.5	<0.5	49	<0.5	<0.5	5.6	12	<0.5	<0.5	<0.5	17	<0.5	<0.5	<0.5	54	<0.5	<0.5	<0.5	--	--
Tetrachloroethylene	ug/L	13	<0.5	<0.5	<0.5	119	<0.5	<0.5	<0.5	12	<0.5	<0.5	<0.5	17	<0.5	<0.5	<0.5	54	<0.5	<0.5	2.3	5	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table B-5 Summary of 2013 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
2,3,7,8-TCDD (Dioxin)	ug/L	2	ND	<0.000005	53	ND	<0.000005	2	ND	<0.000005	0	NA	--	18	ND	<0.000005	0.00003	--
2,4,5-TP (Silvex)	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	18	ND	<1	50	--
2,4-D	ug/L	2	ND	<10	54	ND	<10	2	ND	<10	0	NA	--	18	ND	<10	70	--
3-Hydroxycarbofuran	ug/L	2	ND	<3	45	ND	<3	2	ND	<3	0	NA	--	18	ND	<3	--	--
Acetochlor	ug/L	2	ND	<0.1	27	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Alachlor	ug/L	2	ND	<1	55	ND	<1	2	ND	<1	0	NA	--	19	ND	<1	2	--
Aldicarb	ug/L	2	ND	<3	45	ND	<3	2	ND	<3	0	NA	--	18	ND	<3	--	--
Aldicarb Sulfone	ug/L	2	ND	<4	45	ND	<4	2	ND	<4	0	NA	--	18	ND	<4	--	--
Aldicarb Sulfoxide	ug/L	2	ND	<3	45	ND	<3	2	ND	<3	0	NA	--	18	ND	<3	--	--
Aldrin	ug/L	2	ND	<0.075	46	ND	<0.075	2	ND	<0.075	0	NA	--	18	ND	<0.075	--	--
Atrazine	ug/L	2	ND	<0.5	54	ND	<0.5	2	ND	<0.5	0	NA	--	19	ND	<0.5	1	--
Bentazon	ug/L	2	ND	<2	54	ND	<2	2	ND	<2	0	NA	--	18	ND	<2	18	--
Bromacil	ug/L	2	ND	<10	43	ND	<10	2	ND	<10	0	NA	--	18	ND	<10	--	--
Butachlor	ug/L	2	ND	<0.38	43	ND	<0.38	2	ND	<0.38	0	NA	--	18	ND	<0.38	--	--
Carbaryl	ug/L	2	ND	<5	45	ND	<5	2	ND	<5	0	NA	--	18	ND	<5	--	--
Carbofuran	ug/L	2	ND	<5	54	ND	<5	2	ND	<5	0	NA	--	18	ND	<5	18	--
Chlordane	ug/L	2	ND	<0.1	54	ND	<0.1	2	ND	<0.1	0	NA	--	18	ND	<0.1	0.1	--
Chlorothalonil	ug/L	0	NA	--	1	ND	<5	0	NA	--	0	NA	--	18	ND	<5	--	--
Cis-1,3-Dichloropropene	ug/L	13	ND	<0.5	45	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	0.5	--
Dalapon	ug/L	2	ND	<10	54	ND	<10	2	ND	<10	0	NA	--	18	ND	<10	200	--
DCPA (Total Di & Mono Acid Degradates)	ug/L	2	ND	<0.1	41	D	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Diazinon	ug/L	2	ND	<0.1	41	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Dicamba	ug/L	2	ND	<1.5	45	ND	<1.5	2	ND	<1.5	0	NA	--	18	ND	<1.5	--	--
Dieldrin	ug/L	2	ND	<0.02	45	ND	<0.02	2	ND	<0.02	0	NA	--	18	ND	<0.02	--	--
Dimethoate	ug/L	2	ND	<0.1	41	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Dinoseb	ug/L	2	ND	<2	54	ND	<2	2	ND	<2	0	NA	--	18	ND	<2	7	--
Diquat	ug/L	2	ND	<4	54	D	<4	2	ND	<4	0	NA	--	18	ND	<4	20	--
Endothall	ug/L	2	ND	<45	54	ND	<45	2	ND	<45	0	NA	--	18	ND	<45	100	--
Endrin	ug/L	2	ND	<0.1	54	ND	<0.1	2	ND	<0.1	0	NA	--	18	ND	<0.1	2	--
Eptc	ug/L	2	ND	<0.1	27	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Gamma-BHC (Lindane), Total	ug/L	2	ND	<0.2	55	ND	<0.2	2	ND	<0.2	0	NA	--	18	ND	<0.2	0.2	--
Glyphosate	ug/L	2	ND	<25	54	ND	<25	2	ND	<25	0	NA	--	18	ND	<25	700	--
Heptachlor	ug/L	2	ND	<0.01	54	ND	<0.01	2	ND	<0.01	0	NA	--	18	ND	<0.01	0.01	--
Heptachlor Epoxide	ug/L	2	ND	<0.01	54	ND	<0.01	2	ND	<0.01	0	NA	--	18	ND	<0.01	0.01	--
Hexachlorobenzene	ug/L	2	ND	<0.5	54	ND	<0.5	2	ND	<0.5	0	NA	--	18	ND	<0.5	1	--
Hexachlorocyclopentadiene	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	18	ND	<1	50	--
Methiocarb	ug/L	2	ND	<0.5	44	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	--	--
Methomyl	ug/L	2	ND	<2	45	ND	<2	2	ND	<2	0	NA	--	18	ND	<2	--	--
Methoxychlor	ug/L	2	ND	<10	55	ND	<10	2	ND	<10	0	NA	--	18	ND	<10	30	--
Metolachlor	ug/L	2	ND	<0.05	41	ND	<0.05	2	ND	<0.05	0	NA	--	0	NA	--	--	--
Metribuzin	ug/L	2	ND	<0.05	41	ND	<0.05	2	ND	<0.05	0	NA	--	0	NA	--	--	--
Molinate	ug/L	2	ND	<2	54	ND	<2	2	ND	<2	0	NA	--	18	ND	<2	20	--
Oxamyl	ug/L	2	ND	<20	54	ND	<20	2	ND	<20	0	NA	--	18	ND	<20	50	--
Pentachlorophenol	ug/L	2	ND	<0.2	54	ND	<0.2	2	ND	<0.2	0	NA	--	18	ND	<0.2	1	--
Picloram	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	18	ND	<1	500	--
Propachlor	ug/L	2	ND	<0.5	43	ND	<0.5	2	ND	<0.5	0	NA	--	18	ND	<0.5	--	--

Table B-5 Summary of 2013 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Propoxur	ug/L	2	ND	<0.5	44	ND	<0.5	2	ND	<0.5	0	NA	--	0	NA	--	--	--
Simazine	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	19	ND	<1	4	--
Terbacil	ug/L	2	ND	<0.1	27	ND	<0.1	2	ND	<0.1	0	NA	--	0	NA	--	--	--
Thiobencarb	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	18	ND	<1	70	1
Toxaphene	ug/L	2	ND	<1	54	ND	<1	2	ND	<1	0	NA	--	18	ND	<1	3	--
Trans-1,3-Dichloropropene	ug/L	13	ND	<0.5	45	ND	<0.5	12	ND	<0.5	17	ND	<0.5	54	ND	<0.5	--	--

Notes:
Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.
Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA

Table B-6 Summary of 2013 Radioactive Constituent Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Gross Alpha	pCi/L	--	--	--	--	47	-1.8	1.6	7.5	--	--	--	--	1	3.1	3.1	3.1	4	0.494	0.494	0.494	15	--
Gross Alpha Counting Error	pCi/L	--	--	--	--	47	0.26	0.7	3.4	--	--	--	--	1	2.8	2.8	2.8	4	0.11	0.17	1.12	--	--
Gross Alpha MDA95	pCi/L	--	--	--	--	46	0.78	2.1	3.4	--	--	--	--	1	3	3	3	4	1.51	2.3	2.59	--	--
Gross Beta	mrem/yr	--	--	--	--	6	2.3	2.3	2.3	--	--	--	--	1	-3	-3	-3	--	--	--	--	4 [9]	--
Gross Beta Counting Error	pCi/L	--	--	--	--	6	0.6	1.2	1.3	--	--	--	--	1	1.1	1.1	1.1	--	--	--	--	--	--
Gross Beta MDA95	pCi/L	--	--	--	--	6	2	3	3	--	--	--	--	1	3	3	3	--	--	--	--	--	--
Radium 226	pCi/L	--	--	--	--	8	0.53	0.53	0.53	--	--	--	--	--	--	--	--	--	--	--	--	5 [10]	--
Radium 226 Counting Error	pCi/L	--	--	--	--	4	0.14	0.15	0.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 226 MDA95	pCi/L	--	--	--	--	8	0.32	0.37	0.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 228	pCi/L	--	--	--	--	8	0.48	0.48	0.48	--	--	--	--	--	--	--	--	1	-1	-1	-1	5 [10]	--
Radium 228 Counting Error	pCi/L	--	--	--	--	3	0.23	0.28	0.66	--	--	--	--	--	--	--	--	1	0.381	0.381	0.381	--	--
Radium 288 MDA95	pCi/L	--	--	--	--	8	0.34	0.76	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	pCi/L	--	--	--	--	5	0.62	0.62	0.62	--	--	--	--	--	--	--	--	--	--	--	--	20	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW), formerly the CA Dept. of Public Health.

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. pCi/l = picocuries per liter; mrem/yr = millirem per year.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results in 2011 for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method. In these cases, the upper bound of the estimate is presented.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.
9. Gross beta has an MCL of 4 mrem/yr, but is reported in units of pCi/L. The DDW requires additional testing by public water systems when gross beta is above 50 pCi/L.
10. The MCL is 5 pCi/L for radium-226 and radium-228 combined.

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